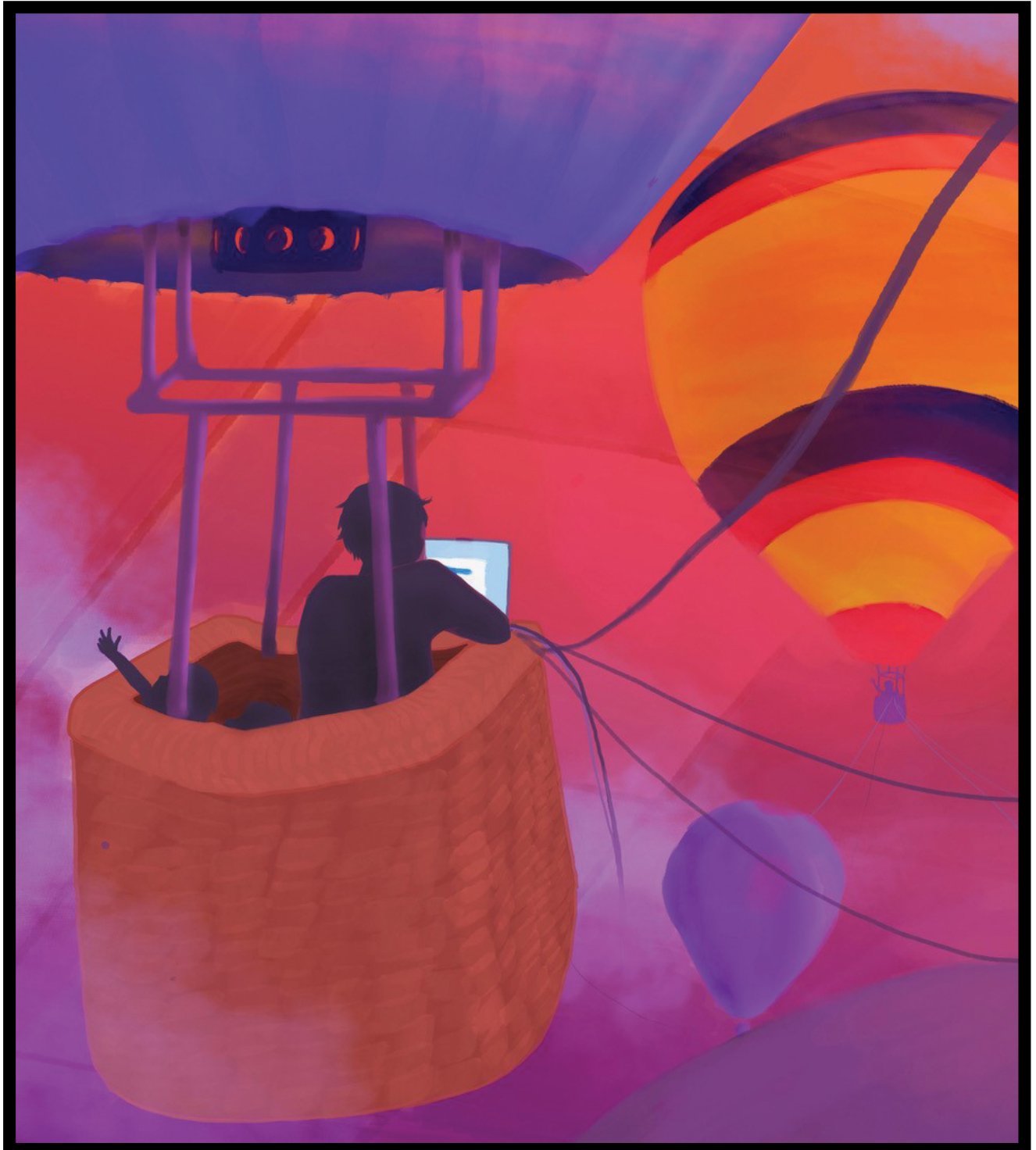


Technical COMMUNICATION

Journal of the Society for Technical Communication



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Journal of the Society for Technical Communication

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The Society for Technical Communication is the largest association of technical communicators in the world. STC is currently classifying the Body of Knowledge for the field and communicating the value of technical communication. Its volunteer leadership continues to work with government bodies and standards organizations to increase awareness and accurate perception of technical communication. Membership is open to all with an interest in technical communication. Visit the STC website (www.stc.org) for details on membership categories, fees, and benefits.

Technical COMMUNICATION

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About the Journal

Technical Communication is a peer-reviewed, quarterly journal published by the Society for Technical Communication (STC). It is aimed at an audience of technical communication practitioners and academics. The journal's goal is to contribute to the body of knowledge of the field of technical communication from a multidisciplinary perspective, with special emphasis on the combination of academic rigor and practical relevance.

Technical Communication publishes articles in five categories:

- Applied research – reports of practically relevant (empirical or analytical) research
- Applied theory – original contributions to technical communication theory
- Case history – reports on solutions to technical communication problems
- Tutorial – instructions on processes or procedures that respond to new developments, insights, laws, standards, requirements, or technologies
- Bibliography – reviews of relevant research or bibliographic essays

The purpose of *Technical Communication* is to inform, not impress. Write in a clear, informal style, avoiding jargon and acronyms. Use the first person and active voice. Avoid language that might be considered sexist, and write with the journal's international audience in mind.

Our authority on spelling and usage is *The American Heritage Dictionary*, 4th edition; on punctuation, format, and citation style, the Publication Manual of the American Psychological Association, 6th edition.

Manuscript Preparation and Submission

Submitting a manuscript to *Technical Communication* for review and possible publication implies that its submission has been approved by all authors, researchers, and/or organizations involved, that the manuscript (or a substantial portion) has not been published before, and that the manuscript is not under review elsewhere.

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- Page 2: Structured abstract – A summary of the article (maximum 250 words), using the headings "Purpose," "Method," "Results," and "Conclusion"
- Page 3: Up to five keywords and a practitioner's takeaway (maximum 100 words) displayed as a bulleted list summarizing the practical implications of the article
- Page 4: Start of the manuscript
- References
- Tables and figures – Start each table or figure on a new page. Assign each table and figure a number and title. If a manuscript is accepted for publication, provide high-resolution images.

Send the manuscript as an attachment to an e-mail message to the editor-in-chief at tceditor@stc.org.

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Miriam F. Williams, Editor

Balancing Strategy and Flexibility: An Interview with President of the STC Board of Directors, Kirsty Taylor

By Miriam F. Williams, Editor



In this issue of *Technical Communication*, a common theme running throughout the authors' excellent research is the need to balance strategy and flexibility in our work. Over the past two years, organizations around the world have had to find new ways to be both strategic and flexible in providing goods and services to clients and customers. To introduce this issue, I had the pleasure of speaking with the President of the Society for Technical Communication (STC) Board of Directors, Kirsty Taylor, about STC, its future, and the ways that technical communicators have balanced strategy and flexibility over the past two years.

Miriam Williams: Thank you for taking the time to speak with us. Please tell us a bit about your background in technical communication. What attracted you to the field of technical communication and to STC?

Kirsty Taylor: When I first went to university, I started a bachelor of information technology degree. It took me a while to figure out that I really didn't want to write software code for the rest of my life, but that I enjoyed communicating about technology. After changing degrees, I somehow learned about

technical communication, and spent a week working with a local small company writing their first user doc. I'd found my niche, combining working in and with technology, but focussing on figuring out and explaining the technology to the users of the technology.

I joined STC after being a technical writer for a year or two. I was attracted by the opportunity to (remotely) meet fellow tech comm professionals, to have access to the STC publications, and perhaps one day travel all the way to the US for the annual Summit. I continue to be involved in STC because in this organization, I can find people with new insights into our industry, as well as years of experience—I can find the technical communication managers who've been running tech comm departments, the authors of so many of my favourite industry books, and so many people I can learn from. I haven't found other associations with a mixture of individual practitioners, doc department managers, as well as people with expertise in UX, knowledge management, localization, APIs, technical illustration, business analysis, and more. I continue to be astounded by how we all apply our technical

communication skills across various industries, contexts, and develop additional specialties that enhance our core skills.

Williams: As the President of STC's Board of Directors, what is your vision for the organization and the field of technical communication?

Taylor: For STC, I hope that the challenges of recent years help us to evolve into an organization for the future. Community is at the core of our association, and I want us to continue to create opportunities for both physical and virtual communities in a way that's manageable for dedicated volunteers and provides value for current and future members who attend.

For the industry, our core communication and explanation skills will always be needed. Whether we're writing a variety of content deliverables using DITA, personalized content for specific user personas, localizing our content into 10 languages, or focusing on embedding instructional videos—or in 20 years' time creating content types in ways that I can't imagine—we'll still need to be communicators and explainers.

Balancing Strategy and Flexibility

Williams: What advice would you give *Technical Communication* readers in academia who are interested in collaborating on research projects with technical communicators in industry?

Taylor: Join STC—and find industry connections through the various STC networks—chapters, SIGs, the membership database, our Slack community. Through these networks, as well as STC publications and education offerings, you can find connections with many industry practitioners around the world.

Williams: Over the past two years, in what ways have you seen technical communicators respond to recent challenges using strategy and flexibility?

Taylor: The first way I've seen technical communicators respond to challenges in the past two years is embracing remote work. So many of my international colleagues are still primarily working from home, or only just venturing into a hybrid working model with some work from home and some office time. Remote work is a wonderful way that technical communicators can use and share many skills with their coworkers—communication, organization, and flexibility. The second way has been embracing virtual connections with our technical communication colleagues—whether through attending virtual conferences, such as the Summit in the past two years, or moving STC community meetups to an online model, allowing more people to attend without the hassle of commuting and traffic.

Williams: Thank you, Kirsty, for your time and all that you do for STC.

IN THIS ISSUE

I also had the pleasure of asking the authors featured in this issue what advice they might offer the *Technical Communication* audience about the importance of balancing strategy and flexibility when considering the methods or recommendations in their articles.

The first article in this issue is “Promoting Social Justice through Usability in Technical Communication: An Integrative Literature Review,” by Keshab Raj Acharya. The article, “provides an integrative literature review on usability, its goals, and approaches to accomplish those goals in relation to *Technical Communication's* commitment to social justice and empowerment.” Regarding strategy and flexibility, Keshab Raj Acharya wrote:

Given technical communications' recent cultural and social justice turns, the article draws the attention of technical communication practitioners to effective usability implementation for promoting social justice and user empowerment. As technical communication goes global and businesses engage in some form of international interaction, practitioners also need to think about how they can develop localized products and what strategies they can adopt to empower underserved users in a global context. As I mention in my article, many design methods developed in the West for improving usability may not always work well in non-Western cultures, so employing flexible design

approaches for handling uncertainties during the design process is often essential to meeting the needs of culturally diverse users, including underprivileged, underserved, or marginalized user groups.

The second article in this issue is “Context, Cognition, and the Dynamics of Design Thinking: Cognitive Methods for Understanding the Situational Variables Affecting Usable Design” by Kirk St.Amant. The article “examines how the cognitive science concepts of scripts and prototypes can help realize the potential of design thinking in different settings.” In response to my question, Kirk St.Amant wrote:

The balance between strategy and flexibility is a matter of audience. It involves answering the question: What does your audience expect in relation to the content or product you are creating? The entry “Context, Cognition, and the Dynamics of Design Thinking” presents a modified design thinking approach that can help technical communicators better understand such audience dynamics when addressing issues of strategy and flexibility. Specifically, the article explains how an application of cognitive concepts to design thinking practices can help technical communicators identify the flexibility they have in creating content for different audiences. Such understanding can help technical communicators find a workable balance between the strategy to use and the flexibility they have when

Miriam F. Williams, Editor

developing products for others to use.

The third article in this issue is “Signaling Context in Topic-Based Writing,” by Jason Swarts. The article, “investigates how relative ‘that’ and ‘which’ clauses are used to signal context in writing that is intended to be free of obligatory contextual connections to other topics in a documentation set.” Jason Swarts notes:

My article speaks to the complications of adopting a strategy of flexibility, actually. Whereas in book-based writing the strategy for communicating with end users could be to lead them through content toward an idealized goal, one of the aims of topic-based writing has been to create flexibility as the goal. When content is presented as granular topics, we afford end users the flexibility to chart their own progress through the documentation, the flexibility to put together a message that satisfies their situated needs. But this flexibility needs to be balanced with attention to the assumptions that writers make of their readers and their ability to work with the flexibility that the topic-based media have provided. The recommendations that I offer in the article show ways that writers can provide subtle, strategic guidance without stifling the flexibility that readers need.

The fourth article is “Helping Content Strategy: What Technical Communicators Can Do for Non-Profits” by Guiseppe Getto

and Suzan Flanagan. In this article, Getto and Flanagan’s research “explores how technical communicators can assist non-profits by helping them develop effective content strategies.” The authors note:

Flexibility is key when working in content strategy, especially with non-profits. Non-profits frequently do not have the resources available to private businesses to pay for first-rate content strategy, so it’s important to meet them where they are. Practitioners should ask themselves: what can the organization improve based on the resources they have access to? At the same time, many non-profits don’t have a strategy for their content, meaning working with them to develop one is also a key part of improving their organization. The strategy needs to be realistic and grounded in their actual resources, however, not necessarily based on best practices that work for larger, better-funded organizations. As a rule of thumb, don’t be afraid to deviate from best practices if it improves the organization, but always seek to educate the non-profit in best practices in case resources become available in the future. Hopefully, your efforts will improve the organization, funding will increase, and they will be able to apply best practices in the future. That’s always the goal.

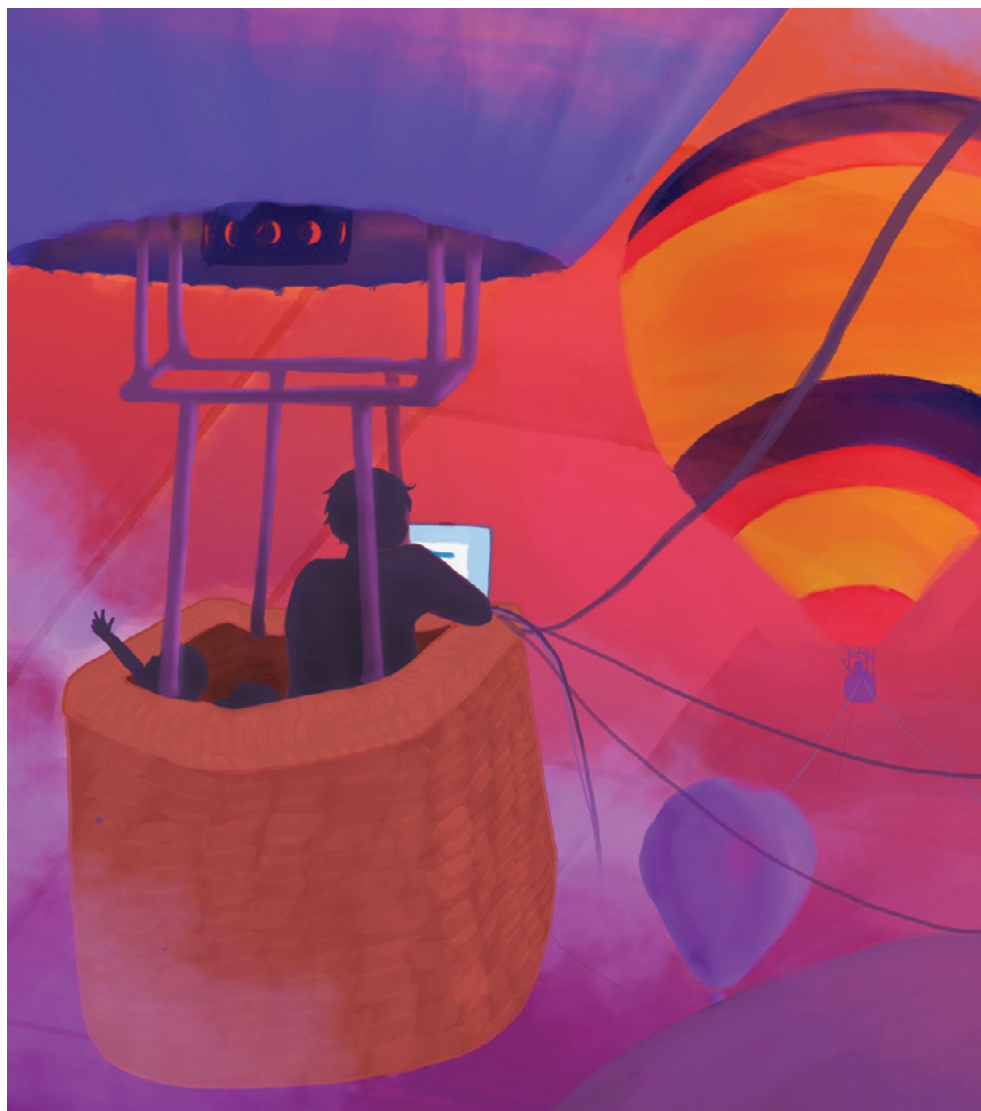
The final article is “Snowpocalypse 2021: Understanding Stakeholder Topoi in the 2021 Texas Power Grid” by Rachel Martin Harlow.

This article “is the first step in exploring how public policymakers use the expert knowledge and nonexpert knowledge they acquire in oversight hearings.” In response to my question, Rachel Martin Harlow wrote:

Flexibility is particularly important when using computer-aided content analysis. While this technology is rapidly improving, it is still bound to whatever denotative meaning is programmed into the software used to code documents. The use of artificial intelligence will help identify connotative meaning and may eventually be robust enough to identify irony. However, in policy discourse particularly, there is much to be learned from what is not expressed in words. Humans are still superior at reading between the lines and completing enthymematic reasoning. Even the best strategy for interpreting large data sets will miss points of importance if only computer-aided content analysis is applied.

The authors in this issue provide us with important answers to questions about how to be both strategic and flexible in the important work of technical communication. The articles provide important recommendations about usability and social justice, helping readers to locate contextual information, enhancing design thinking, developing content strategies for nonprofits, and using content analysis on public policy discourse.

On the Cover



ARTIST'S NOTE

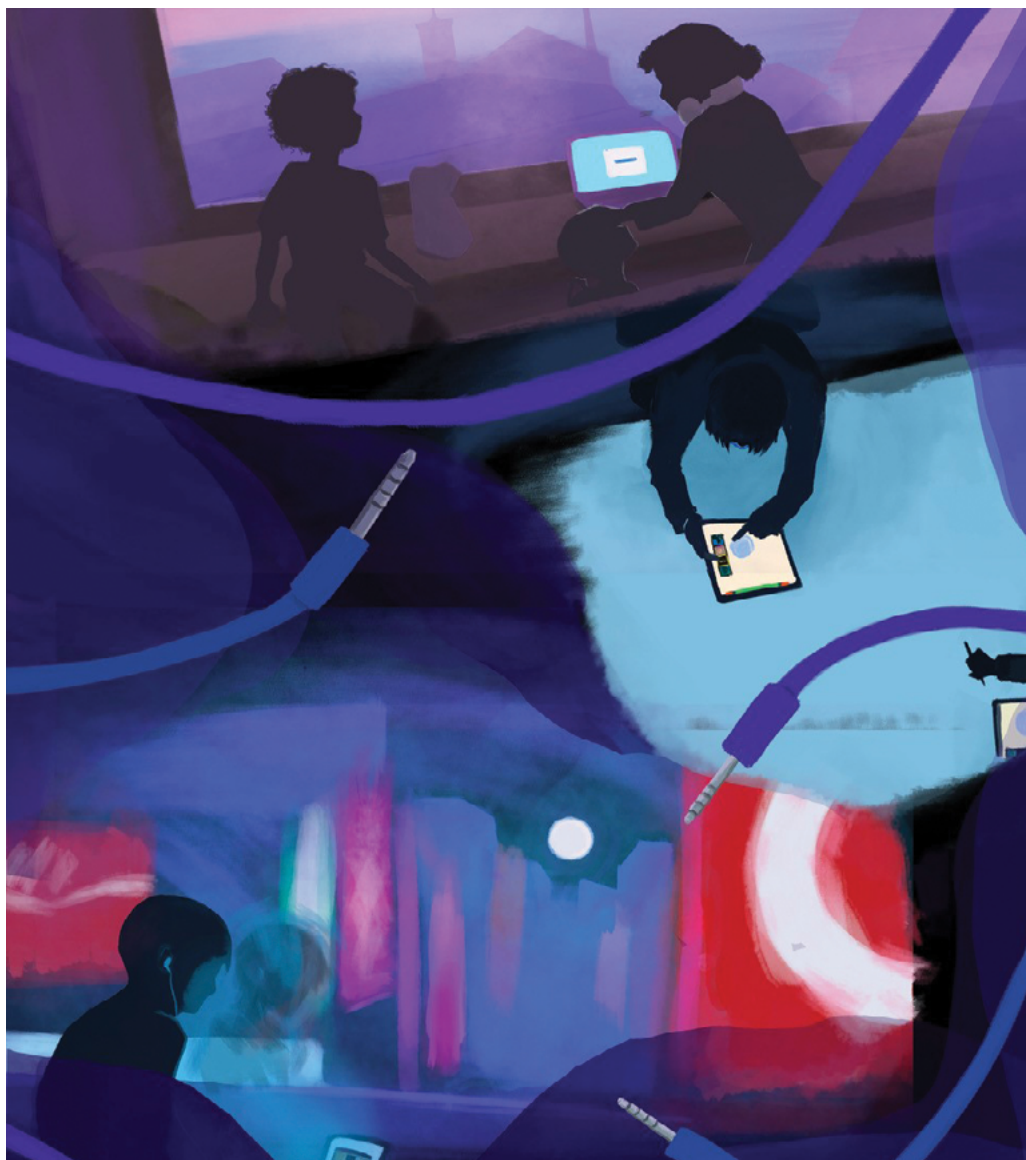
This illustration depicts a whimsical representation of the nature of remote work, as it shows a person working “remote” in a hot air balloon. There are other air balloons shown that presumably have passengers as well who are caught up in the remote work environment. This artwork is meant to be metaphoric as it shows the difficulty in making connections in this new way of working as well as the adjustments made by the people who work remotely. Power cords can be seen connecting the person to the other balloons, as well as a couple of younger passengers who are supposed to represent the adults’ experiences having to work from home and within the same space as their family.

ABOUT THE ARTIST

Ana Morales’ artwork was selected by a five-member international jury as the winner of the February 2022 STC Cover Contest. Morales’ second submission was selected by the international jury for Honorable Mention. Ana Morales is a student at Midwestern State University (MSU) and is currently studying graphic design. In addition to

her studies and time spent creating art, Ana enjoys reading and playing tennis in her hometown of Denton, Texas. While most of her experience is in oil paint, she also enjoys developing new skills in digital painting and video editing. She hopes to utilize those skills in her future career. Her future plans are to apply for the MSU visual art department's juried student exhibition, where she previously won in the graphic design category.

Honorable Mention



ARTIST'S NOTE

This illustration shows snippets of possible work environments people exist in due to the necessity of remote work. Each scene gives a hint as to a different and perhaps more unusual time that people are caught working their weekly hours and reference the different time zones disrupting normal schedules. Family, teamwork, and creative independence are represented in this composition.

Promoting Social Justice Through Usability in Technical Communication: An Integrative Literature Review

doi: <https://doi.org/10.55177/tc584938>

By Keshab Raj Acharya

ABSTRACT

Purpose: Recently, interest in usability has grown in the technical communication (TC) field, but we lack a current cohesive literature review that reflects this new growth. This article provides an integrative literature review on usability, its goals, and approaches to accomplish those goals in relation to TC's commitment to social justice and empowerment.

Methods: I conducted an integrative literature review on usability to synthesize and characterize TC's growing commitment to social justice and empowerment. I searched scholarly publications and trade literature that included books and book chapters on usability. Adopting grounded theory and content analysis as research techniques to systematically evaluate data corpus, I read and classified selected publications to approach the research questions and iteratively analyzed the data to identify themes within each research question.

Results: Surveying the definitions and descriptions of usability in the literature corpus shows that there is no consensus definition of usability. Findings suggest that the goal of usability can be classified as: a) pragmatic or functional goals, b) user experience goals, and c) sociocultural goals. Given the recent cultural and social justice turns in TC, my findings reveal a number of social justice-oriented design approaches for usability.

Conclusions: Usability should not be viewed solely as a means of achieving pragmatic and/or user experience goals. Practitioners also need to consider usability from sociocultural orientations to accomplish its sociocultural goals. From interconnected global perspectives, the review implies the need for adopting more viable and culturally sustaining design approaches for successfully accommodating cultural differences and complexities for promoting social justice and user empowerment.

KEYWORDS: usability, integrative literature review, localization, social justice, user empowerment, inclusion, technical communication

Practitioner's Takeaway

- Provides an overview of usability, its goals, and the approaches for accomplishing those goals;
- Offers broader perspectives on usability in relation to designing technical products, systems, or tools that satisfy the demands and contingencies of culturally diverse users, including underprivileged, underserved, and marginalized user groups;
- Offers insights on approaching usability from social justice perspectives to create meaningful and empowering technical products by recognizing the shift from pragmatic usability to sociocultural orientations of usability

INTRODUCTION

Usability is a central concern in technical communication (TC) when designing products, systems, or tools—such as application interfaces, websites, software, online help systems, and print or online documentation—from users' perspectives (Alexander, 2013; Johnson, 1998; Redish, 2010; Salvo, 2001; Scott, 2008). Usability research demonstrates why designers should heed to generate tools that are easy to use and understand for the intended users (Barnum, 2002; Dumas & Redish, 1993; Gould & Lewis, 1985). Recognizing the need for and importance of creating such tools from users' viewpoint, interest in usability research and practice in differing cultural contexts has also been growing recently in the TC field (see, for example, Agboka, 2014; Cardinal, Gonzales, & Rose, 2020; Dorpenyo, 2020; Gonzales & Zantjer, 2015; Gu & Yu, 2016; Saru & Wojahn, 2020; Sun, 2020). In fact, usability has many natural ties to TC and both have a long, intertwined history since the 1970s through today (Breuch, Zachry, & Spinuzzi, 2001; Redish, 2010; Redish & Barnum, 2011).

Despite the long inherent connections between usability and TC, our field lacks an integrative literature review to better understand usability in relation to the field's recent cultural and social justice turns. Such a lack draws attention to the need for investigating “how communication, broadly defined, can amplify the agency of oppressed people—those who are materially, socially, politically, and/or economically under-resourced” (Jones & Walton, 2018, p. 242). To be clear, an integrative literature review works to assemble “representative literature on a topic in an integrated way such that new frameworks and perspectives on the topic are generated” (Torraco, 2016, p. 356). The lack of synthesis in research makes it difficult to review emerging topics, ideas, or concepts that generate new knowledge and a growing body of literature about the topic reviewed (Torraco, 2016). Because such review is performed to “make a significant, value-added contribution to new thinking in the field” (Torraco, 2005, p. 358), this study aims to accomplish this by holistically understanding:

- usability and its goals in TC research and scholarship;
- design approaches to promote social justice and user empowerment; and
- the extent to which usability research in the TC field has been conducted in international contexts.

More specifically, this integrative literature review sought to address the following two research questions:

RQ1: How is usability defined, and what are its goals?

RQ2: What design approaches have been proposed to promote social justice and user empowerment?

To address these questions, I undertook an integrative literature review of usability in both peer-reviewed TC journal articles and trade literature that included books and book chapters on usability over the past 40 years. As discussed in detail later, I compiled a data set consisting of 27 books, 14 book chapters, and 82 journal articles over a span of 40 years (1980–2020). Drawing upon grounded theory (Charmaz, 2014; Corbin & Strauss, 2015) and content analysis as research techniques (Huckin, 2004; Krippendorff, 2019), I analyzed the representative data set for emergent and recurring themes by unitizing (segmenting the text for analysis), sampling (selecting an appropriate collection of texts for analysis), and validating (using the consistent coding scheme) the data corpus (Boettger & Palmer, 2010).

In what follows, I first provide a brief note on how the emergence, expansion, and current state of usability development influenced my research. I then discuss my research method followed by the results as answers to my research questions. Finally, I highlight the implications of the study and conclude by providing suggestions for further research.

A Brief Note on the Emergence and Evolution of Usability

Along with the development of computer technology in the early 1980s, the usability profession largely started by raising usability issues related to user interfaces (Johnson, 1998; Redish, 2010; Redish & Barnum, 2011). When Apple introduced the Macintosh in 1984, issues concerning computer interfaces prevailed in usability engineering as novice users struggled to perform desired tasks due to a fundamental mismatch between the design of a technology and users' expectations and capabilities (Sedgwick, 1993). To address such concerns, many usability specialists, especially from the engineering field, advocated for user research to improve usability (Barnum, 2002; Nielsen, 1993). In designing interfaces from users' perspective, scholars argued for integrating the think-aloud method into the design process to ask users to verbalize their thoughts while interacting with

Promoting Social Justice Through Usability

the system (Boren & Ramey, 2000; Ericsson & Simon, 1980; Hughes, 1999; Mack, Lewis, & Carroll, 1983; Whiteside, Bennett, & Holtzblatt, 1988).

Decades of discussions in TC as a field have also consistently emphasized the need for designing technical products through the lens of usability (Carroll, 1990; Johnson, 1994; Schneider, 2005; Schriver, 1993; Spinuzzi, 2003; Sullivan, 1989); thus, the relevance of usability to technical communication had inherent support. Though usability has long been advocated for creating usable products in the context of use (St. Amant, 2015, 2017a; Sun, 2012; Zachry & Spyridakis, 2016), recent usability research and practices in TC move toward approaching usability for social justice and user empowerment (Acharya, 2018; Dorpenyo, 2020; Light & Luckin, 2008; Walton, 2016). This integrative review was initiated by acknowledging this new direction in usability for promoting social justice and user empowerment (i.e., enabling users of a product, including underserved and underprivileged user groups, to accomplish their intended goals with all possibilities and improve their quality of life).

METHODOLOGY

For this study, I collected data from both scholarly publications and trade literature to gain a full picture of usability and its implications for TC work. Data sources could be expanded to a wide range of publications on usability, including gray literature (i.e., literature published outside of traditional, commercial, or academic publishing and distribution channels). But, I confined my review only to trade literature and five major TC journals because I needed “logical parameters to set boundaries for the study” (Melonçon & St. Amant, 2018). Otherwise, I would still be searching, coding, and analyzing data sets. All sources of literature for inclusion fulfilled the following criteria:

- published over the last four decades (1980–2020, at the time of this study)
- focused primarily on usability, usability research, and practice in relation to TC
- helped shape my research questions

I chose the 1980s as my corpus’s starting point because the decade represents many technical communicators’ significant transition from writing as user advocates to functioning as usability specialists (McGovern, 2005; Redish & Barnum, 2011).

The data search was an iterative process. I conducted several trial runs with the keyword categories, refining and modifying the keywords to gain the best possible results. I used the Boolean special characters * to optimize the keywords and “” to search for exact phrasings, as well as the Boolean terms AND, OR, and NOT to look for overlapping concepts and produce more relevant research. As a result, I used the following list of keywords for each database and search engine: *usability* AND technical communication, usability AND usability testing, “usability research,” “user-centered technology,” usability*/in technical comm*, “localized usability,” cross-cultural/design*, “human-centered design OR user experience design.”*

In order to capture my research topic broadly and isolate information irrelevant to this study, I compiled the corpus from the following repositories:

- my university library databases, including IEEE Xplore, ScienceDirect, and ACM Digital Library, as well as the general database
- Google Scholar, Amazon.com, and Google Books
- five widely referenced TC journals:
 - *Technical Communication*
 - *Journal of Technical Writing and Communication* (JTCW)
 - *Journal of Business and Technical Communication* (JBTC)
 - *IEEE Transactions on Professional Communication* (IEEE)
 - *Technical Communication Quarterly* (TCQ)

I selected these journals based on past research practices exhibited by TC researchers and practitioners, including Boettger and Lam (2013) and Melonçon and St. Amant (2018). As we know, these journals are “the markers of the disciplines’ knowledge creation and perpetuation” (Boettger & Palmer, 2010) and the “core/central sources of scholarship in the [TC] field” (Melonçon & St. Amant, 2018, p. 132).

In addition to the literature found through the broad search of the databases and search engines, I checked sources included in the reference lists of the articles and their original publication venues to validate findings and enrich the analysis. This process also allowed me to “find additional relevant literature by examining references in the literature already obtained” (Torraco, 2016, p. 416).

In scholarly publications, I included only full-length, research-based articles (i.e., no commentaries,

book reviews, etc.). This scope produced a data corpus of 129 scholarly publications and 51 trade publications. I evaluated each source iteratively to determine their relevance to usability in TC to further narrow the sample. This left a study size of 82 articles, 27 books, and 14 book chapters based on the above criteria. The analysis and discussion that follows is confined only to these 123 data sources.

Informed by content analysis (Huckin, 2004; Krippendorff, 2019), also a major research methodology in TC (see, for example, Boettger & Palmer, 2010; Brumberger & Lauer, 2015; King & McCarthy, 2018), I evaluated the collected texts for emergent and recurring themes by unitizing (segmenting definitions of relevant units), sampling (selecting samples for analysis), and validating (employing the consistent coding scheme) the representative data corpus. Adopting standard research coding techniques (Coffey & Atkinson, 1996) and grounded theory (Charmaz, 2014; Corbin & Strauss, 2015), I performed initial coding by reviewing each data source to distinguish concepts and categories. In the second phase of coding (i.e., axial coding), I assembled the categories into causal relationships by grouping, sorting, and reducing the number of codes generated from the first cycle of coding (Charmaz, 2014). This process allowed me to see the relationships between concepts and categories developed in the open coding process (Corbin & Strauss, 2015).

To evaluate the corpus from the lens of content analysis, I developed starter codes and piloted them on the data sets to norm my data analysis approach. Then, I conducted pattern coding to pull materials together into more meaningful units to identify key themes, configuration, and explanation (Miles & Huberman, 1994). I coded the data corpus iteratively to maintain the degree of consistency and reduced the clusters to the point of saturation through the process of analysis and reanalysis (Charmaz, 2014). Once themes were derived, I reevaluated their relationships based on my research questions as broad organizational thematic categories.

Just as with other research work, this study has its limitations and strengths. For instance, I did not include publications on usability from sources such as magazines, professional blog postings, podcasts, and slide decks. Because the origin of usability has no single root, the review cannot be regarded as an ultimate synthesis of usability scholarship in TC. Although I do believe that an expanded version of the review might

synthesize knowledge on the topic by offering different perspectives, doing so carefully and thoughtfully would be enormously labor intensive and time consuming (Melonçon & St.Amant, 2018). Additionally, other researchers looking at the same corpus might draw different conclusions and implications.

RESULTS

This section presents the results of my review of the usability literature to address each of my research questions.

RQ1: How is usability defined, and what are its goals?

To address this question, I focused on how the term “usability” was defined and discussed by authors in the consulted scholarly publications and trade literature. My findings showed that usability can refer to a process (i.e., a form of evaluation), a characteristic (i.e., the degree to which a product or system is usable), and a professional discipline (i.e., an approach to or study of user research to better understand user needs, expectations, and behaviors). In other words, usability is a multifaceted construct used by different disciplines for different purposes and meanings (Table 1).

The term “usability” is traditionally used to mean how easily and quickly an individual can use a product to perform a desired objective (Barnum, 2002, 2011; Dumas & Redish, 1993; Gould & Lewis, 1985; Nielsen, 1993; Rosenbaum, 1989; Whiteside, Bennett, & Holtzblatt, 1988). As Table 1 displays, usability refers to the degree to which a product can be effectively used by target users to perform intended tasks (Guillemette, 1989; Rosenbaum, 1989). The definition also includes more specific attributes such as efficiency, effectiveness, learnability, accuracy, satisfaction, error recovery, and retention over time (Nielsen, 1993; Quesenbery, 2003; Shneiderman, Plaisant, Cohen, Jacobs, Elmqvist, & Diakopou, 2018). Johnson (1998) examines usability as an iterative process that helps achieve desired goals by means of repeated cycles of testing a product or system. In Mirel’s (2002) view, usability is not related to one specific dynamic feature or attribute but to a comprehensive whole that provides users with a good, positive work experience. According to Haaksma, De Jong, and Karreman (2018), “These days, usability includes not only ease of use, but also factors of efficacy and appreciation” (p. 117).

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Table 1. Sample Definitions of Usability

Definition	Source
"... the ease with which people in a defined group can learn and use a product."	Rosenbaum (1989, p. 210)
"... how well target readers can achieve their tasks using the material under environmental constraints and how acceptable the material is to readers in supporting those activities."	Guillemette (1989, p. 217)
involves multi-dimensional properties or components of a user interface—ease of use, ease of learning, usefulness, error recovery, memorability, and pleasantness.	Mirel (2002); Nielsen (1993)
"... <i>the people who use the product can do so quickly and easily to accomplish their own tasks</i> " (emphasis in original).	Dumas & Redish (1993, p. 4)
"... the ease with which a user (or users) can learn about or use a computer system."	Johnson (1998, pp. 80–81)
"... a set of practices that aim to improve the experiences people have with designed artifacts."	Johnson-Eilola & Selber (2007, p. 195)
conducting user research to engage users as co-researchers or co-designers "in the development of the research question, the study design, and the evaluation of the research through participatory research and participatory evaluation."	Eyman (2009, p. 214)
"... creating products and services that are easy to use in a range of cultural environments."	St.Amant (2017a, p. 123)

As rooted in several broad disciplines such as psychology, human factors, and cognitive science, usability is also understood as a discipline that is concerned with the design, evaluation, and implementation of interactive products, systems, or tools. As argued by Spinuzzi (2001), usability relates to the entire activity system in which a product is used—the system involving society, culture, history, and interpretation. Broadly speaking, usability as a discipline is about researching and designing effective technical products or materials by engaging users as co-researchers or co-designers (Eyman, 2009; Salvo, 2001; Simmons & Zoetewey, 2012; Spinuzzi, 2001).

Examining usability from a cross-cultural stance, Sun (2012), on the other hand, asserts that usability is not just about the functionality of a product, but it should be understood in terms of a holistic view of design "as both situated action and constructed meaning" in the differing cultural context of use (p. 55). Similarly, Agboka (2013) looks at usability from participatory localized perspectives, meaning empowering users by accommodating cultural factors prevalent in users' sites. Agboka (2013) implicitly hints

that usability means how well local practices and values are incorporated into a product for a user from another culture.

As TC goes global and businesses engage in some form of international interaction, usability should be viewed from the perspective of meeting end users' needs and expectations across a range of cultural environments (St.Amant, 2017b). In short, usability, particularly in TC, is now broadly perceived as a rhetorical practice for designing a product that satisfies the demands and contingencies of culturally diverse users, including underserved and underprivileged user groups, in the increasingly globalized world.

Thus, my findings show that one definition of usability cannot be provided because its definition "change[s] from context to context," from community to community (Salvo, 2001, p. 276). Findings suggest that besides two types of definitions of usability commonly present as process-focused definitions and user-focused definitions, there is a third type that I classify as sociocultural-focused definitions of usability associated with sociocultural aspects of a product for user empowerment, inclusion (Ladner, 2015; Light &

Luckin, 2008; Rose, 2016; Sun, 2020; Walton, 2016), and accessibility (Gonzales, 2018; Roberts, 2006; Saru & Wojahn, 2020).

Goals of Usability

As the definition of usability varies depending on the disciplinary practices of scholars, there are certain goals of usability implementation. Based on my study of the collected data sources, I grouped these goals into three thematic categories: a) pragmatic goals, b) user experience goals, and c) sociocultural goals. The following section discusses each category in turn.

Pragmatic Goals

The pragmatic goals of usability are typically associated with the activities that are performed to assess how quickly and easily users use the product to achieve their desired objectives (Barnum, 2002; Dumas & Redish, 1993; Krug, 2014; Nielsen, 1993). In other words, the goals that involve optimizing a user's interaction with a product come under this category. As discussed by Nielsen (1993), Quesenberry (2003), and Shneiderman et al. (2018), pragmatic or functional goals are primarily related to usability attributes, including:

- **Learnability:** how easy the product is for a new user to learn and work with;
- **Efficiency:** how well the user can perform the assigned tasks;
- **Memorability:** how easily the user can re-establish proficiency after a long time of use;
- **Error recovery:** how easily the user can recover from any incorrect user action made when using the product;
- **Utility:** to what extent the product provides the right kind of functionality to enable the user to perform desired tasks; and
- **Time:** how long it takes for the user to learn how to use actions relevant to a set of tasks.

Pragmatic goals are useful for measuring the extent to which a product is usable in a given context. However, they do not help address the overall quality of the user's interaction with and perceptions of the product, which is where the user experience goals of usability come into play.

User Experience Goals

While pragmatic goals are concerned with assessing how usable a product is from its own perspective, user experience (UX) goals relate to how users experience

the product from their perspective (Sharp, Rogers, & Preece, 2019). Many of these subjective qualities cover a range of both desirable and undesirable emotions and felt experiences: enjoyable or unpleasant; satisfying or frustrating; exciting or boring (Garrett, 2011; Hassenzahl, 2014; Norman, 2013).

UX encompasses a wide range of user-related aspects, including emotional, psychological, and physical reactions that occur before, during, and after an interaction with a product (Haaksma, De Jong, & Karreman, 2018; Hassenzahl & Tractinsky, 2006; Norman, 2004; Roy, 2013). According to Norman (2013), UX means everything that touches upon the user's experience with the product—including sharing the experience with others or telling somebody about it. Hassenzahl and Tractinsky (2006) define UX as a consequence of a user's internal state (motivation, expectations, needs, mood, etc.), the characteristics of the product (functionality, complexity, usability, purpose, etc.), and the context or environment within which the interaction with the product occurs. Buley (2013), on the other hand, looks at UX as a professional practice (a set of techniques or methods for researching what users need and want, and to design products or services for them), an outcome (the overall effect created by the interaction and perception that the user has when using a product or service), and an interdisciplinary field (includes visual design, content strategy, product management, writing, analytics, and engineering).

UX highlights non-utilitarian aspects of the user's interaction with interface design, shifting the focus from product functionality to user affect and sensation in day-to-day life (Haaksma, De Jong, & Karreman, 2018; Law, Roto, Hassenzahl, Vermeeren, & Kort, 2009). The qualities that contribute to making a good user experience include, but are not limited to:

- **Satisfying:** the pleasure and the fulfillment of desire users derive from their interactions with the product;
 - **Motivating:** stimulating users' interest in using the product;
 - **Enjoyable:** no frustrations encountered while using the product; and
 - **Aesthetically pleasing:** the product is beautiful, charming, elegant, and appealing in appearance.
- Users' emotional attachment and involvement with a product is as important as how easily and quickly the

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product can be used (Norman, 2004). Thus, the UX goals of usability fulfill more than just pragmatic or functional needs.

As global markets for technical products and services grow, so does the need to address the requirements and expectations of users from other cultures (Acharya, 2019; St.Amant, 2017a; Sun, 2020). What is acceptable and usable in one social culture can be unthinkable in another. So, the designer should consider local culture and the context of use when developing products for multicultural users, including underserved and underprivileged user groups. In short, designers should address the needs and expectations of users from differing cultures and localities for user empowerment and inclusion, which is where the sociocultural goals of usability come into play.

Sociocultural Goals

The sociocultural goals of usability involve designing products to empower and improve the lives of users within and across cultures. Recent usability research and scholarship in TC also shows the need for focusing on the sociocultural goals of usability to promote social justice, user empowerment, and accessibility (Acharya, 2019; Dorpenyo, 2020; Oswal, 2019). By considering such goals during the design process, designers can support local legal and political systems, local knowledge, social behaviors, as well as local norms prevailing at users' sites (Agboka, 2013; Dorpenyo, 2020; Rose et al., 2017; Sun, 2020). In examining usability from a sociocultural perspective, various factors determine a product's usability in the target culture where the product is used—the factors associated with:

- **Empowerment:** in what ways a product can empower individuals to accomplish their goals with all possibilities;
- **Inclusion:** how the product can support the full range of human diversity;
- **Accessibility:** to what extent the product is accessible to users, including people with disabilities;
- **Meaningfulness:** how the product makes sense to users from different cultures; and
- **Sociocultural practices:** to what extent the product meets users' needs, expectations, and behaviors to support their local forms of life within and across cultures and nations.

Users' perceptions of design effectiveness and the context of use can affect product usability in the target culture with which the designer shares the product. In other words, sociocultural factors—the behaviors, norms, values, and belief systems of an individual's culture—also determine a product's usability.

Every culture can have different expectations and needs (St.Amant, 2017a). This means that what works in one cultural system may not work respectively in another. As such, usability practitioners need to know how culture affects users' expectations and perceptions of technical materials in a different social context or environment (Shivers-McNair & San Diego, 2017; St.Amant, 2015). As argued by Sun (2006), "The local culture in which a [product] is used should be investigated in a context where the collective and the individual meet and where the implementation (instrumental aspect) and interpretation (social aspect) interact" (p. 460). Multicultural users have different needs and requirements, so designers must learn how to localize their products. From a localized design perspective, a successful product is one that is developed by recognizing sociocultural, legal, linguistic, and political systems in the target culture—all in light of multicultural users' needs, preferences, and expectations (Agboka, 2013; Saru & Wojahn, 2020). In short, it is critically important to look at the goals of usability from locally situated sociocultural perspectives, for local variables or factors affecting the use of an item in given cultural systems and traditions also determine product usability in the context of use.

Thus, while the broad goals of usability encompass effectiveness, efficiency, ease-of-use, and user satisfaction, scholars have also indicated other equally important goals associated with cultural usability—situating use practices within the user's sociocultural systems and traditions. So, it is not enough to design a product for the users who share the cultural systems and traditions with the designer in today's globally interconnected world. Users' actual practices of social activities, including those practiced by underserved and underprivileged user groups in other cultures, should also be heeded in the product design process to foster social justice and user empowerment. For these reasons, usability practitioners should consider how sociocultural goals of usability can be achieved to address concerns related to cultural usability and how usability, broadly speaking, can empower users,

especially those who are overlooked, underserved, and/or oppressed in the margins. The next section discusses the approaches developed to achieve the goals of usability in an attempt to answer my second research question.

RQ2: What design approaches have been proposed to promote social justice and user empowerment?

My integrative review of usability literature demonstrates the need for employing effective design approaches by understanding what works well for the user and how to make design improvements to meet user expectations (Al-Awar, Chapanis, & Ford, 1981; Johnson, Salvo, & Zoetewey, 2007; Rubin & Chisnell, 2008). Adopting an effective approach to usability can help the designer work with reliability and validity of a product for promoting social justice and user empowerment. In truth, products need to be developed by employing more comprehensive design approaches for addressing issues related to navigation, simplicity, comprehensibility, efficiency, accessibility, and effectiveness (Battleson, Booth, & Weintrop, 2001; Donker-Kuijer, De Jong, & Lentz, 2008; Nielsen, 1999; Nielsen & Molich, 1990; Nielsen & Pernice, 2010; Redish, 2012).

Based on my research study, I grouped the design approaches into two thematic categories:

- designing for usability
- usability for social justice and user empowerment

I explain each of them below, highlighting the key approaches related to each category to achieve the usability goals as discussed above.

Designing for Usability

For decades, usability practitioners and researchers have advocated for deploying effective design approaches for enhancing usability. For instance, usability can be optimized in a document, both print and online, by adopting the minimalist approach—that is, using targeted or focused information to perform relevant tasks quickly and efficiently (Carroll, 1990, 1998; Obendorf, 2009; Redish, 1989; van der Meij, 2003; van der Meij & Carroll, 1995). From a minimalist perspective, information should guide the user to perform real, work-based tasks in a simplified way (Mackenzie, 2002; Mirel, 1998; Moran, 2015; Oatey & Cawood, 1997; Redish, 1989). Likewise, a plain language approach to documentation helps designers

present information in a format that is easy to find, read, and understand (Redish, 2000, 2012; Redish et al., 2010; Schriver, 1997). Adopting a plain-language approach to usability does not only mean simple writing and design; it also means ethically-motivated communications (Matveeva, Moosally, & Willerton, 2017; Willerton, 2015), striving for honest conversation through accuracy, clarity, usefulness, truthfulness, and accessibility, especially for those with low literacy skills (Greene, Cleary, & Marcus-Quinn, 2017; Schriver, 2017; Willerton, 2015).

Looking at plain language from a social justice and human rights perspective, scholars such as Jones and Williams (2017) assert that language accessibility plays a large role in enacting civic engagement and social activism. Unnecessarily complex language, for instance, increases extraneous mental efforts that impair learning and thereby reinforces social marginalization (Cheung, 2017). As a marked shift from clear communication to critical action for redressing injustice, plain language accessibility can be a useful tool for thinking about and developing strategies to achieve equity and inclusion. Thus, in promoting equitable civic engagement and user empowerment, the plain-language approach to usability calls on the ability to engage diverse and often underserved non-experts to make content clear, usable, useful, understandable, and accessible.

Advocating for usability to accomplish either the pragmatic or the UX goals of usability, scholars have proposed other design approaches such as participatory design (Ehn, 1992; Moore & Elliott, 2015; Simmons, 2007; Spinuzzi, 2005), user-centered design (Andrews et al., 2012; Card, Moran, & Newell, 1983; Johnson, 1998), and user experience (UX) design (Garrett, 2011; Hassenzahl & Tractinsky, 2006; Norman, 2004). Adopting the participatory design (PD) approach means working with the user as both an actor and a co-designer to co-construct the whole design practice and make design decisions collaboratively (Bannon & Ehn, 2013; Simmons, 2007; Spinuzzi, 2005; Stephens & DeLorme, 2019; Zachry & Spyridakis, 2016).

Focusing on the “how” of design rather than the “what,” TC scholars have also argued for user participation to cooperatively design a product to maximize its usability by responding to users’ needs and expectations (see, for example, Getto, 2014; Longo, 2014; Salvo, 2001; Spinuzzi, 2005). Situating the participant as a co-creator or collaborative partner,

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the PD approach holds that the effective design methodology is one that engages users at every level of the design process, including preliminary research, assessing user needs, prototyping, and user testing (Bacha, 2018; Getto, 2014; Oswal, 2014).

Similarly, the user-centered design (UCD) approach considers the user not only as an inevitable entity in the design process but also as an “integral, participatory force in the process” (Johnson, 1998, p. 30). Unlike PD where users control the design, feel ownership, and work with the design team as co-designers, users do not control the design in UCD (Spinuzzi, 2003). Instead, task support is crucial, which means designers must know who the users are, what they wish to accomplish, and what support they need to perform the desired objectives successfully. To get user insights and shape the design of a product for usability, a number of usability inspection techniques are suggested:

- think-aloud protocols (Boren & Ramey, 2000; Cooke, 2010; Ericsson & Simon, 1980; Mack, Lewis, & Carroll, 1983)
- heuristic evaluation (Nielsen & Molich, 1990)
- cognitive walkthrough (Wharton, Rieman, Lewis, & Polson, 1994)
- eye-tracking (Cooke, 2005, 2008)
- video highlights (Yeats & Carter, 2005)
- cognitive shortcut (Lentz & De Jong, 2009)
- contextual inquiry (Mirel, 1996)

Identifying user needs and recognizing the kind of support a product can provide form the basis of the product’s requirements and ground subsequent design and development to achieve the pragmatic goals of usability. These activities are fundamental to a UCD approach.

Central to the user experience design (UXD) approach, on the other hand, is the process of creating products to achieve the UX goals of usability—the goals associated with supporting users’ needs, expectations, and behaviors (Garrett, 2011; Norman, 2004; Schriver, 2001; Williams, 2007). UXD concerns how a product keeps the user engaged in continuous exploration, provides a deeper level of personal satisfaction, and becomes a part of the user’s lifestyle (Roy, 2013). As argued by Garrett (2011), it is UX that determines the quality of a product as experienced by the user—anything from hate to love, from anger to happiness, from indifference to passion, from hope to despair, from pride to humiliation. In fact, building usability

into a product requires more than achieving pragmatic and/or user experience goals of usability. It also requires understanding users’ entire perceptions of use, their interpretation of those perceptions, and resulting changes in their personal and social lives. To meet these requirements in national and international contexts, attention should be given to the sociocultural goals of usability during the design process, which, in turn, will promote social justice and user empowerment.

Usability for Social Justice and User Empowerment

To achieve the sociocultural goals of usability and TC’s commitment to justice and empowerment, more collaborative and respectful design approaches should be considered during the design process. These approaches include “narrative inquiry” (Jones, 2016a), “decolonial methodologies” (Agboka, 2014; Haas, 2012), “participatory localization,” (Agboka, 2013), and “culturally localized user experience” (CLUE) (Sun, 2012). While narrative inquiry as a design tool is ideal for engaging considerations of social justice and empowerment by privileging participant agency and voice in relation to design (Jones, 2016a), decolonial methodologies serve to address issues of localized usability by decolonizing the myth that users are simply manipulators and passive recipients of information. Participatory localization, on the other hand, emphasizes “user involvement, not as isolated user participation but as *user-in-community* involvement and participation in the design phase of products” (Agboka, 2013, p. 42, emphasis in original).

Likewise, the CLUE approach helps study and inform cross-cultural design by integrating action and meaning through a dialogical, cyclical design process and by delivering “a holistic user experience for culturally diverse users” (Sun, 2012, p. 81). Discussing how the CLUE approach functions, Sun (2012) writes, “The CLUE approach begins with an exploration of user activity in context for design inspirations, and continues and circulates in a cycle as users localize a technology according to their lifestyles” (p. 82). Adopting CLUE as a design approach allows usability practitioners to integrate design aspect and use aspect into a product to be used in locally situated cultural contexts, which means designing meaningful and empowering products for users, including underserved and underprivileged user groups, from diverse cultures.

As the TC field today engages largely with attentiveness to audiences in the global context, a number of TC scholars have advocated for localization usability, emphasizing that a product designed for one culture needs to be revised or customized to fit the user of another (see, for example, Agboka, 2013; Dorpenyo, 2019, 2020; Gonzales & Zantjer, 2015; Gu & Yu, 2016; St.Amant, 2009, 2017a; Sun, 2012; Yunker, 2003). Localization should be relevant to local needs and should take place at users' sites as a collaborative effort between the users and the product. In short, we should not forget that "user localization, audience analysis, and cross-cultural communication are [also] important practices in our field" (Shivers-MacNair & San Diego, 2017, p. 109).

Discussing user localization as integrating a technology into a "user's everyday life after adoption, socially and emotionally" (p. 249), Sun (2012) contends that the differences of local cultures should be taken into account for enhancing the dynamic interaction between situated uses and the surrounding local cultural context. By definition, localization means contextualizing a product (Agboka 2013; Rose et al., 2017; Suchman, 2002; Sun, 2012) and meanings (Gonzales & Zantjer, 2015) to improve people's lives, including those of the underserved and the underprivileged, in a specific locale where the product is used. To succeed in localization efforts and thereby improve people's lives in underserved and underrepresented communities requires a dedicated focus on the locally situated sociocultural systems, traditions, and the context of use situation—including users' knowledge, their social practices, and the nature of work in which they are engaged (St.Amant, 2017a). So, as noted by Sun (2012), "If meaning and cultural factors are not carefully studied and attended to in design, serious breakdowns will occur" (p. 51). In this sense, from a social justice perspective, usability is not limited to assessing the functional characteristics of a product; it also implies how the product can meaningfully change or improve users' lives, especially but not exclusively in underserved and underrepresented communities.

Understanding usability from a social justice perspective provides insights into the ways the design of a product can empower and prioritize certain groups of users and pushes others to the margin. In designing for user empowerment, usability practitioners need

to "recognize and acknowledge that particular designs prioritize and privilege particular people and that, as such, these designs can function as exclusionary sites of injustice" (Walton, Jones, & Moore, 2019, p. 85). To address issues of social justice and user empowerment, usability practitioners need to consider underserved user groups' contributions, interpretations, and participation as co-designers throughout the product design cycle. Essentially, usability for social justice and user empowerment necessitates employing inclusive design approaches for supporting users, particularly those who are marginalized and disempowered in the dominant culture.

Thus, this integrative literature review on usability in relation to TC elucidates usability as an important area of study in the TC field that has recently turned to a new direction—shifting from a primarily instrumental to a justice-oriented design focus. This orientation asks usability practitioners to think about deploying localization strategies in ways that will reify and promote empowerment and positively impact the lived experiences of product users in the target locale (Jones & Williams, 2018). While thinking about localization, designers, however, should not take the local and the global as a binary relation, as both of them are mutually constituted by each other (Sun & Getto, 2017). More importantly, they are "so closely intertwined that the former is actually one part of the latter" due to "an open, back-and-forth dialogue" constantly happening between them (Sun, 2012, p. 25). In the next section, I present the study's implications for TC as informed in the representative data corpus analyzed for this study.

IMPLICATIONS

In this section, I discuss the implications of this study for practice, research, and pedagogy in TC. As indicated in the literature, I also include some challenges of integrating usability into these areas from a social justice perspective.

Implications for Practice

As the field of TC expands internationally, practitioners have weighty responsibilities to produce usable and accessible technical materials for multicultural users. Along with TC's recent cultural and social justice turns, practitioners need to look beyond traditional design approaches in order to better understand how usability can redress inequities and promote justice.

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Since usability is concerned with social justice, user empowerment, accessibility, and related issues (Acharya, 2019; Clement, 1994; Dombrowski, 2017; Light & Luckin, 2008; Oswal, 2019; Rose, 2016), practitioners should be attentive to how they can develop good-experience-driven localized products to empower culturally diverse users in the international context. To create meaningful and empowering products for multicultural users, practitioners should also be aware of how they can incorporate social justice-oriented, inclusive design approaches into such products with a fuller understanding of users' sociocultural systems (i.e., the systems of ethics, norms, and language) and the context of use. Implementing more flexible and justice-oriented design approaches as advocated by TC scholars (see, for example, Agboka, 2013; Haas, 2012; Jones, 2016a; Sun 2012) might help usability practitioners learn more about the possibilities of designing the products that engage cultural differences (i.e., locally situated sociocultural systems and traditions) for fostering social justice and user empowerment. When designing for global contexts, it is imperative to use flexible design methods to deal with uncertainties during the design process. Of course, rigid design approaches can, in Spinuzzi's (2000) words, "marginalize, inhibit, and discourage certain types of users and assign circumscribed roles to those [users]" (p. 215).

In considering these factors during the design process, practitioners, however, might face a number of challenges. For instance, despite TC's cultural and social justice turns, industries may not reflect this change or may consider it to be important but not economically feasible. Also, many powerful national and international corporations might not realize how centering the voices and experiences of underserved and marginalized user groups can lead to more comprehensive design considerations, methods, practices, and resulting designs for social justice (Rose et al., 2018). Additionally, the skills, competencies, and knowledge technical communicators possess have not been recognized as a good background for usability-related jobs (Lauer & Brumberger, 2016; Redish & Barnum, 2011). More so, many workplaces give less priority and value to what technical communicators do (Martin, Carrington, & Muncie, 2017). This is arguably due to managers and technical staff harboring outdated views of TC and usability, which have traditionally been relegated to the end of the design

and production process. By demonstrating how user advocacy promotes social justice and inclusion and how an advocacy perspective in design adds value to broader organizational goals, TC practitioners might gain institutional power harnessed by their colleagues who are product designers, engineers, programmers, or managers.

Implications for Research

Given the needs expressed in the literature, one direction the TC field can take is that of research focused on the usability of information products or systems to improve "the human experience for the oppressed"—interrogating and investigating how oppressed or underserved groups experience the world in which they live (Jones, 2016b, p. 357). Theofanos and Redish (2003, 2005) argue for a paradigm shift toward equal accessibility for the underserved, including vision-impaired users, to achieve the same sense of experience clear-sighted people do. As stated by the authors, designing instructions to accommodate people with disabilities is not sufficient; it is also critically important to observe, listen to, and talk with them to improve usability for accessibility. Essentially, a social justice perspective on usability research can address which users are advocated for and whose experience and expertise should be brought to the center for building the culture of inclusivity.

Another direction the TC field needs to pursue is that of localization usability for promoting social justice and user empowerment in the resource-constrained international context. In reviewing the usability literature over the last 40 years, I noted that the question concerning user empowerment in relation to usability for un/disenfranchised and underrepresented users across cultures is not well addressed in TC research and scholarship. A few scholars have called for creating culturally sensitive products for the targeted user community (see, for instance, Getto & St.Amant, 2015; Hall, De Jong, & Steehouder, 2004; St.Amant, 2017a; Sun, 2012). However, TC research on localized usability for promoting social justice and user empowerment in resource-constrained, underdeveloped countries is very limited.

Conducting usability research across cultures and nations can be complex for many reasons. One key challenge a usability researcher can confront is choosing the appropriate research method to collect

rich, detailed data that afford the researcher a thorough knowledge of what is being studied. For instance, many data collection methods developed in the West for improving usability (such as in-depth interviews, surveys, focus groups, and think-aloud protocols) do not always work well in non-Western cultures (Baxter, Courage, & Caine, 2015). Other challenges might involve access to research participants, language gaps, translation, cultural differences, and ethical and legal obligations. More importantly, the challenge is to address “the resonance expectations of different audiences—audiences who have varying [cultural and language] backgrounds . . . and who view research as relating to different objectives” in the international context (St.Amant & Graham, 2019, p. 6). Despite these challenges, conducting research on usability for social justice across cultures and nations can, in Sauer’s (2018) words, “offer our field more and better prospects for future prosperity” (p. 370). Building an inclusive, just future starts with understanding the needs and expectations of all users, including underserved, underrepresented user groups from different cultures. Usability research in TC, thus, should be directed toward supporting these groups by engaging cultural differences globally.

Implications for Pedagogy

Much of the work of technical communicators involves developing products or materials by responding to audiences’ usability expectations (Alexander, 2013; Haaksma, De Jong, & Karreman, 2018; St.Amant, 2017a). For this reason, integrating usability projects into our pedagogical practices and programs can help students learn how to design technical materials from users’ perspectives (Cleary & Flammia, 2012; Howard, 2018; Zhou, 2014). Doing so can also facilitate students’ learning about user needs and requirements by developing partnerships with communities and organizations (Chong, 2016; Rose et al., 2017; Scott, 2008). Though many TC programs offer usability courses, they are often not sufficient for students to acquire marketable skills for the workplace to ensure their success (Chong, 2016, 2018; Harner & Rich, 2005). To better prepare students for developing empowering products and working toward building a just future, TC programs should focus on offering courses that include social justice-related usability projects. Such projects ultimately allow students to

acknowledge what it means to center the voices and desires of those who have been marginalized and traditionally been poorly treated by technical systems and services (Jones & Williams, 2017; Walton, 2016). Through such projects, students can also learn how to implement design solutions for user empowerment. Offering usability courses in TC with a focus on fostering social justice, thus, can play a large role in preparing students for generating meaningful and empowering products to improve life for those that are socially disadvantaged and underserved in the dominant culture. In short, integrating social justice-oriented usability projects into the usability courses in TC curricula can ultimately facilitate students to understand what it means to design for building a culture of inclusivity.

As the TC field grows internationally, there is also the need for equipping students with related educational practices to generate effective technical products and informational services in the global marketplace (St.Amant, 2011). To build our pedagogical foundations on the international level, TC instructors need to consider incorporating usability-related projects into their pedagogical practices to prepare students for developing a variety of meaningful and empowering materials for global distribution. Furthermore, to shift usability practices for social changes and actionable outcomes, such projects should be designed in ways that can “provide technical communication students with education in engaged citizenship” (Sapp & Crabtree, 2002, p. 412) to work toward creating “a more equitable, accessible society” (Palmeri, 2006, p. 63).

As my review of the literature suggests, there are, however, some unusual practical challenges of integrating usability projects into our courses and curricula. First, these types of projects entail more time, resources, and effort (Breuch, Zachry, & Spinuzzi, 2001; Chong, 2016; Leydens, 2012; Scott, 2008). Second, what students learn about usability for social justice and inclusion in an academic setting may not comply with what they find in a workplace setting. For instance, technical communication has changed along with its cultural and social justice turns, but industries might not reflect this change. Also, technical communicators are not often viewed as professionals with user research backgrounds in many industrial settings and their roles remain separate from those of

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development teams and user research groups (Redish & Barnum, 2011). Third, instructors may face budgetary difficulties and/or administrative obstacles to implementing such projects most effectively. Finally, collaborating with real users as co-designers in international contexts can be more challenging and difficult due to various factors, including language barriers, cultural differences, and time zone differences.

CONCLUSIONS

As my integrative literature review reveals, several diverging conceptualizations of usability exist in the literature, and offering a consensus definition of usability is a challenging enterprise. More interestingly, it illustrates that usability as a topic has recently begun to shift TC's disciplinary practices and research from designing solely for accomplishing functional and UX goals to designing holistically for attaining sociocultural-related goals through the implementation of social justice-oriented design approaches. This shift in how we approach usability has clear implications for how we need to approach practice, research, and instruction for promoting social justice and user empowerment in globally changing environments. In short, we need to reconceptualize usability and its goals to shape and change the future of TC with what Dilger (2006) calls "extreme usability" that focuses on achieving results expediently.

To address the recent calls for localized cultural usability research in building an inclusive form of TC (Agboka, 2013; Opel, 2014; Rose, 2016; Walton & Jones, 2013), my review suggests the need for adopting more viable design approaches for creating meaningful and empowering products for multicultural users, especially those who have "limited access to, or reduced availability of, resources" (Rose, 2016, p. 433). The attention to usability for social justice and user empowerment is still at the emerging stage concerning localized cultural designs from international perspectives. In essence, as the momentum for usability rapidly grows, TC practitioners should deem how they can help build a just, equitable future and how they can support the needs and expectations of all users, including populations that have been overlooked, underserved, or marginalized, as well as populations from non-Western cultures.

Suggestions for Further Research

This study suggests that usability is not limited to what makes a product expedient to use, but also considers how the product can play a key role in improving peoples' lives. The study reveals the need for further studies of usability for social justice and user empowerment through empirical studies that can validate current understandings of best usability practices in diverse organizational or workplace settings. The study also indicates the importance of localization usability as well as the need to train the next generation of usability practitioners in TC more extensively. Given the consistent calls made for enhancing social justice and inclusivity through better design, significant further studies on usability for social justice and user empowerment are needed. And I strongly believe now is the time for our field to commit to action that fulfills TC's longstanding commitment to such agendas.

On a personal level, after working on this review and reading dozens and dozens of articles, books, and other materials on usability, I find myself with more questions than answers:

- What is (or should be) the role or place of usability in integrated content environments, where teams such as marketing, tech pubs, and training share content models and taxonomies and single source (or multi-source) content to varied channels in varied outputs?
- To what extent have technical products been studied and produced from a social justice perspective in the global context?
- To what extent are underserved, underprivileged, or marginalized user groups within and across cultures and nations taken into consideration in an organizational or workplace setting when designing and developing technical materials for diverse audiences in today's global age?

From social justice and user empowerment perspectives, designers should make usability the first concern in making design decisions and should avoid creating any accessibility barriers for the underserved and the underprivileged, including people with disabilities. As argued by Horton and Quesenbery (2013), "Good accessibility is designed for the full range of capabilities, as well as for the context of use or environmental constraints" (p. 3). As we move forward on building an equitable, just future in the globally interconnected world, TC scholars and practitioners must commit

to exploring and addressing the oppressive effects of particular designs for particular users, especially those in underserved and underprivileged communities, within and across cultures and nations. We must understand the ways in which such designs can function as exclusionary sites of injustice in those cultures and nations.

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REFERENCES

- Acharya, K. R. (2018). Usability for user empowerment: Promoting social justice and human rights through localized UX design. *Proceedings of the 36th ACM International Conference on the Design of Communication*. ACM. <https://doi.org/10.1145/3233756.3233960>
- Acharya, K. R. (2019). Usability for social justice: Exploring the implementation of localization usability in Global North technology in the context of a Global South's country. *Journal of Technical Writing and Communication*, 49(1), 6–32. <https://doi.org/10.1177/0047281617735842>
- Agboka, G. Y. (2013). Participatory localization: A social justice approach to navigating unenfranchised/disenfranchised cultural sites. *Technical Communication Quarterly*, 22(1), 28–49. <https://doi.org/10.1080/10572252.2013.730966>
- Agboka, G. Y. (2014). Decolonial methodologies: Social justice perspectives in intercultural technical communication research. *Journal of Technical Writing and Communication*, 44(3), 297–327. <https://doi.org/10.2190/TW.44.3.e>
- Al-Awar, J., Chapanis, A., & Ford, W. (1981). Tutorials for the first-time computer user. *IEEE Transactions on Professional Communication*, 24(1), 30–37. <https://doi.org/10.1109/TPC.1981.6447820>
- Alexander, K. P. (2013). The usability of print and online video instructions. *Technical Communication Quarterly*, 22(3), 237–259. <https://doi.org/10.1080/10572252.2013.775628>
- Andrews, C., Burleson, D., Dunks, K., Elmore, K., Lambert, C. S., Oppegaard, B., Pohland, E. E., Saad, D., Scharer, J. S., Wesley, M., Wery, R. L., & Zobel, G. (2012). A new method in user-centered design: Collaborative prototype design process (CPDP). *Journal of Technical Writing and Communication*, 42(2), 123–142. <https://doi.org/10.2190/TW.42.2.c>
- Bacha, J. A. (2018). Mapping use, storytelling, and experience design: User-network tracking as a component of usability and sustainability. *Journal of Business and Technical Communication*, 32(2), 198–228. <https://doi.org/10.1177/1050651917746708>
- Bannon, L. J., & Ehn, P. (2013). Design matters in participatory design. In J. Simonsen & T. Robertson (Eds.), *Routledge handbook of participatory design* (pp. 37–63). Routledge.
- Barnum, C. M. (2002). *Usability testing and research*. Longman.
- Barnum, C. M. (2011). *Usability testing essentials: Ready, set . . . test!* Elsevier.
- Battleson, B., Booth, A., & Weintrop, J. (2001). Usability testing of an academic library web site: A case study. *The Journal of Academic Librarianship*, 27(3), 188–198. [https://doi.org/10.1016/S0099-1333\(01\)00180-X](https://doi.org/10.1016/S0099-1333(01)00180-X)
- Baxter, K., Courage, C., & Caine, K. (2015). *Understanding your users: A practical guide to user research methods* (2nd ed.). Morgan Kaufmann.
- Boettger, R. K., & Lam, C. (2013). An overview of experimental and quasi-experimental research in technical communication journals (1992–2011). *IEEE Transactions on Professional Communication*, 56(4), 272–293. <https://doi.org/10.1109/TPC.2013.2287570>
- Boettger, R. K., & Palmer, L. A. (2010). Quantitative content analysis: Its use in technical communication. *IEEE Transactions on Professional Communication*, 53(4), 346–357. <https://doi.org/10.1109/TPC.2010.2077450>
- Boren, T., & Ramey, J. (2000). Thinking aloud: Reconciling theory and practice. *IEEE Transactions on Professional Communication*, 43(3), 261–278. <https://doi.org/10.1109/47.867942>

Promoting Social Justice Through Usability

- Breuch, L. K., Zachry, M., & Spinuzzi, C. (2001). Usability instruction in technical communication programs: New directions in curriculum development. *Journal of Business and Technical Communication*, 15(2), 223–240. <https://doi.org/10.1177/105065190101500204>
- Brumberger, E., & Lauer, C. (2015). The evolution of technical communication: An analysis of industry job postings. *Technical Communication*, 62(4), 224–243.
- Buley, L. (2013). *The user experience team of one: A research and design survival guide*. Rosenfeld Media.
- Card, S. K., Moran, T. P., & Newell, A. (1983). *The psychology of human-computer interaction*. Lawrence Erlbaum.
- Cardinal, A., Gonzales, L., & Rose, E. J. (2020). Language as participation: Multilingual user experience design. *Proceedings of the 38th ACM International Conference on Design of Communication*. ACM. <https://doi.org/10.1145/3380851.3416763>
- Carroll, J. M. (1990). *The Nurnberg funnel: Designing minimalist instruction for practical computer skill*. MIT Press.
- Carroll, J. M. (1998). Reconstructing minimalism. In J. M. Carroll (Ed.), *Minimalism beyond the Nurnberg funnel* (pp. 1–17). MIT Press.
- Charmaz, K. (2014). *Constructing grounded theory* (2nd ed.). Sage.
- Cheung, I. W. (2017). Plain language to minimize cognitive load: A social justice perspective. *IEEE Transactions on Professional Communication*, 60(4), 448–457. <https://doi.org/10.1109/TPC.2017.2759639>
- Chong, F. (2016). The pedagogy of usability: An analysis of technical communication textbooks, anthologies, and course syllabi and descriptions. *Technical Communication Quarterly*, 25(1), 12–28. <https://doi.org/10.1080/10572252.2016.1113073>
- Chong, F. (2018). Implementing usability testing in introductory technical communication service courses: Results and lessons from a local study. *IEEE Transactions on Professional Communication*, 61(2), 196–205. <https://doi.org/10.1109/TPC.2017.2771698>
- Cleary, Y., & Flammia, M. (2012). Preparing technical communication students to function as user advocates in a self-service society. *Journal of Technical Writing and Communication*, 42(3), 305–322. <https://doi.org/10.2190/TW.42.3.g>
- Clement, A. (1994). Computing at work: Empowering action by “low-level users.” *Communications of the ACM*, 37(1), 52–63. <https://doi.org/10.1145/175222.175226>
- Coffey, A., & Atkinson, P. (1996). *Making sense of qualitative data: Complementary research strategies*. Sage.
- Cooke, L. (2005). Eye tracking: How it works and how it relates to usability. *Technical Communication*, 52(4), 456–463.
- Cooke, L. (2008). How do users search web home pages?: An eye-tracking study of multiple navigation menus. *Technical Communication*, 55(2), 176–194.
- Cooke, L. (2010). Assessing concurrent think-aloud protocol as a usability test method: A technical communication approach. *IEEE Transactions on Professional Communication*, 53(3), 202–215. <https://doi.org/10.1109/TPC.2010.2052859>
- Corbin, J., & Strauss, A. (2015). *Basics of qualitative research: Techniques and procedures for developing grounded theory* (4th ed.). Sage.
- Dilger, B. (2006). Extreme usability and technical communication. In J. B. Scott, B. Longo, & K. V. Wills (Eds.), *Critical power tools: Technical communication and cultural studies* (pp. 47–69). SUNY Press.
- Dombrowski, L. (2017). Socially just design and engendering social change. *Interactions*, 24(4), 63–65. <https://doi.org/10.1145/3085560>
- Donker-Kuijter, M. W., De Jong, M., & Lentz, L. (2008). Heuristic web site evaluation: Exploring the effects of guidelines on experts’ detection of usability problems. *Technical Communication*, 55(4), 392–404.
- Dorpenyo, I. K. (2019). Risky election, vulnerable technology: Localizing biometric use in elections for the sake of justice. *Technical Communication Quarterly*, 28(4), 361–375. <https://doi.org/10.1080/10572252.2019.1610502>
- Dorpenyo, I. K. (2020). *User localization strategies in the face of technological breakdown: Biometric in Ghana’s elections*. Palgrave Macmillan.

- Dumas, J. S., & Redish, J. C. (1993). *A practical guide to usability testing*. Ablex.
- Ehn, P. (1992). Scandinavian design: On participation and skill. In P. S. Adler & T. A. Winograd (Eds.), *Usability: Turning technologies into tools* (pp. 96–132). Oxford University Press, Inc.
- Ericsson, K. A., & Simon, H. A. (1980). Verbal reports as data. *Psychological Review*, 87(3), 215–251.
- Eyman, D. (2009). Usability: Methodology and design practice for writing processes and pedagogies. In S. K. Miller-Cochran & R. L. Rodrigo (Eds.), *Rhetorically rethinking usability: Theories, practices, and methodologies* (pp. 213–228). Hampton Press.
- Garrett, J. J. (2011). *The elements of user experience: User-centered design for the web and beyond* (2nd ed.). New Riders.
- Getto, G. (2014). Designing for engagement: Intercultural communication and/as participatory design. *Rhetoric, Professional Communication, and Globalization*, 5(1), 44–66.
- Getto, G., & St.Amant, K. (2015). Designing globally, working locally: Using personas to develop online communication products for international users. *Communication Design Quarterly*, 3(1), 24–46. <https://doi.org/10.1145/2721882.2721886>
- Gonzales, L. (2018). Designing for intersectional, interdependent accessibility: A case study of multilingual technical content creation. *Communication Design Quarterly*, 6(4), 35–45. <https://doi.org/10.1145/3309589.3309593>
- Gonzales, L., & Zantjer, R. (2015). Translation as a user-localization practice. *Technical Communication*, 62(4), 271–284.
- Gould, J. D., & Lewis, C. (1985). Designing for usability: Key principles and what designers think. *Communications of the ACM*, 28(3), 300–311. <https://doi.org/10.1145/3166.3170>
- Greene, M., Cleary, Y., & Marcus-Quinn, A. (2017). Use of plain-language guidelines to promote health literacy. *IEEE Transactions on Professional Communication*, 60(4), 384–400. <https://doi.org/10.1109/TPC.2017.2761578>
- Gu, B., & Yu, M. (2016). East meets west on flat design: Convergence and divergence in Chinese and American user interface design. *Technical Communication*, 63(3), 231–247.
- Guillemette, R. (1989). Usability in computer documentation design: Conceptual and methodological considerations. *IEEE Transactions on Professional Communication*, 32(4), 217–229. <https://doi.org/10.1109/47.44534>
- Haaksma, T. R., De Jong, M. D., & Karreman, J. (2018). Users' personal conceptions of usability and user experience of electronic and software products. *IEEE Transactions on Professional Communication*, 61(2), 116–132. <https://doi.org/10.1109/TPC.2018.2795398>
- Haas, A. M. (2012). Race, rhetoric, and technology: A case study of decolonial technical communication theory, methodology, and pedagogy. *Journal of Business and Technical Communication*, 26(3), 277–310. <https://doi.org/10.1177/1050651912439539>
- Hall, M., De Jong, M., & Steehouder, M. (2004). Cultural differences and usability evaluation: Individualistic and collectivistic participants compared. *Technical Communication*, 51(4), 489–503.
- Harner, S., & Rich, A. (2005). Trends in undergraduate curriculum in scientific and technical communication programs. *Technical Communication*, 52(2), 209–220.
- Hassenzahl, M. (2014). User experience and experience design. In M. Soegaard & R. F. Dam (Eds.), *The encyclopedia of human–computer interaction* (2nd ed.). The Interaction Design Foundation. https://www.interaction-design.org/literature/book/the-encyclopedia-of-human-computer-interaction-2nd-ed/user-experience-and-experience-design#chapter_start
- Hassenzahl, M., & Tractinsky, N. (2006). User experience: A research agenda. *Behaviour & Information Technology*, 25(2), 91–97. <https://doi.org/10.1080/01449290500330331>
- Horton, S., & Quesenberry, W. (2013). *A web for everyone: Designing accessible user experiences*. Rosenfeld Media.
- Howard, T. W. (2018). Teaching usability testing: Coding usability testing data. In T. Bridgeford (Ed.), *Teaching professional and technical communication: A practicum in a book* (pp. 176–202). Utah State University Press.

Promoting Social Justice Through Usability

- Huckin, T. (2004). Content analysis: What texts talk about. In C. Bazerman & P. Prior (Eds.), *What writing does and how it does it: An introduction to analyzing texts and textual practices* (pp. 13–32). Lawrence Erlbaum.
- Hughes, M. (1999). Rigor in usability testing. *Technical Communication*, 46(4), 488–494.
- Johnson-Eilola, J., & Selber, S. A. (2007). Understanding usability approaches. In C. L. Selfe (Ed.), *Resources in technical communication: Outcomes and approaches* (pp. 195–219). Baywood Publishing Company, Inc.
- Johnson, R. R. (1994). The unfortunate human factor: A selective history of human factors for technical communicators. *Technical Communication Quarterly*, 3(2), 195–212. <https://doi.org/10.1080/10572259409364566>
- Johnson, R. R. (1998). *User-centered technology: A rhetorical theory for computers and other mundane artifacts*. SUNY Press.
- Johnson, R. R., Salvo, M. J., & Zoetewey, M. W. (2007). User-centered technology in participatory culture: Two decades “beyond a narrow conception of usability testing.” *IEEE Transactions on Professional Communication*, 50(4), 320–332. <https://doi.org/10.1109/TPC.2007.908730>
- Jones, N. N. (2016a). Narrative inquiry in human-centered design: Examining silence and voice to promote social justice in design scenarios. *Journal of Technical Writing and Communication*, 40(7), 471–492. <https://doi.org/10.1177/0047281616653489>
- Jones, N. N. (2016b). The technical communicator as advocate: Integrating a social justice approach in technical communication. *Journal of Technical Writing and Communication*, 46(3), 342–361. <https://doi.org/10.1177/0047281616639472>
- Jones, N. N., & Walton, R. (2018). Using narratives to foster critical thinking about diversity and social justice. In A. Haas & M. F. Eble (Eds.), *Key theoretical frameworks: Teaching technical communication in the twenty-first century*, 241–267. Utah State University Press.
- Jones, N. N., & Williams, M. F. (2017). The social justice impact of plain language: A critical approach to plain-language analysis. *IEEE Transactions on Professional Communication*, 60(4), 412–429. <https://doi.org/10.1109/TPC.2017.2762964>
- Jones, N. N., & Williams, M. F. (2018). Technologies of disenfranchisement: Literacy tests and Black voters in the US from 1890 to 1965. *Technical Communication*, 65(4), 371–386.
- King, A. S., & McCarthy, M. J. (2018). Artifactual dimensions of visual rhetoric: What a content analysis of 114 peer-reviewed articles reveals about data collection reporting. *Technical Communication Quarterly*, 27(3), 249–260. <https://doi.org/10.1080/10572252.2018.1479587>
- Krippendorff, K. (2019). *Content analysis: An introduction to its methodology* (4th ed.). Sage.
- Krug, S. (2014). *Don't make me think, revisited: A common sense approach to web usability*. New Riders.
- Ladner, R. E. (2015). Design for user empowerment. *Interactions*, 22(2), 24–29. <https://doi.org/10.1145/2723869>
- Lauer, C., & Brumberger, E. (2016). Technical communication as user experience in a broadening industry landscape. *Technical Communication*, 63(3), 248–264.
- Law, E. L., Roto, V., Hassenzahl, M., Vermeeren, A. P., & Kort, J. (2009). Understanding, scoping, and defining user experience: A survey approach. *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, (pp. 719–728). ACM. <https://doi.org/10.1145/1518701.1518813>
- Lentz, L., & De Jong, M. (2009). How do experts assess usability problems? An empirical analysis of cognitive shortcuts. *Technical Communication*, 56(2), 111–121.
- Leydens, J. A. (2012). What does professional communication research have to do with social justice? Intersections and sources of resistance. *Proceedings of IEEE Professional Communication Conference (IPCC), 2012 IEEE International*, (pp. 1–13). IEEE. <https://doi.org/10.1109/IPCC.2012.6408592>
- Light, A., & Luckin, R. (2008). *Designing for social justice: People, technology, learning*. Futurelab.
- Longo, B. (2014). RU There? Cell phones, participatory design, and intercultural dialogue. *IEEE Transactions on Professional Communication*, 57(3), 204–215. <https://doi.org/10.1109/TPC.2014.2341437>

- Mack, R. L., Lewis, C. H., & Carroll, J. M. (1983). Learning to use word processors: Problems and prospects. *ACM Transactions on Information Systems (TOIS)*, 1(3), 254–271. <https://doi.org/10.1145/357436.357440>
- Mackenzie, C. (2002). The need for a design lexicon: Examining minimalist, performance-centered, and user-centered design. *Technical Communication*, 49(4), 405–410.
- Martin, S., Carrington, N., & Muncie, N. (2017). Promoting user advocacy to shift technical communication identity and value. *Technical Communication*, 64(4), 328–344.
- Matveeva, N., Moosally, M., & Willerton, R. (2017). Plain language in the twenty-first century: Introduction to the special issue on plain language. *IEEE Transactions on Professional Communication*, 60(4), 336–342. <https://doi.org/10.1109/TPC.2017.2759619>
- McGovern, H. (2005). Not just usability testing: Remembering and applying non-usability testing methods for learning how web sites function. *Technical Communication*, 52(2), 175–186.
- Melonçon, L., & St.Amant, K. (2018). Empirical research in technical and professional communication: A 5-year examination of research methods and a call for research sustainability. *Journal of Technical Writing and Communication*, 49(2), 128–155. <https://doi.org/10.1177/0047281618764611>
- Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook* (2nd ed.). Sage.
- Mirel, B. (1996). Contextual inquiry and the representation of tasks. *Journal of Computer Documentation*, 20(1), 14–21. <https://doi.org/10.1145/227614.227616>
- Mirel, B. (1998). Minimalism for complex tasks. In J. M. Carroll (Ed.), *Minimalism beyond the Nurnberg funnel* (pp. 179–218). MIT Press.
- Mirel, B. (2002). Advancing a vision of usability. In B. Mirel & R. Spilka (Eds.), *Reshaping technical communication: New directions and challenges for the 21st century* (pp. 165–187). Lawrence Erlbaum.
- Moore, K. R., & Elliott, T. J. (2015). From participatory design to a listening infrastructure: A case of urban planning and participation. *Journal of Business and Technical Communication*, 30(1), 59–84. <https://doi.org/10.1177/1050651915602294>
- Moran, K. (2015). *The roots of minimalism in web design*. Nielsen Norman Group. <https://www.nngroup.com/articles/roots-minimalism-web-design/>
- Nielsen, J. (1993). *Usability engineering*. Academic Press.
- Nielsen, J. (1999). *Designing web usability: The practice of simplicity*. New Riders.
- Nielsen, J., & Molich, R. (1990). Heuristic evaluation of user interfaces. *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (pp. 249–256). ACM. <https://doi.org/10.1145/97243.97281>
- Nielsen, J., & Pernice, K. (2010). *Eyetracking web usability*. New Riders.
- Norman, D. A. (2004). *Emotional design: Why we love (or hate) everyday things*. Basic Books.
- Norman, D. A. (2013). *The design of everyday things: Revised and expanded edition*. Basic Books.
- Oatey, M., & Cawood, M. (1997). Minimalism as a framework. *IEEE Transactions on Professional Communication*, 40(4), 265–274. <https://doi.org/10.1109/47.650004>
- Obendorf, H. (2009). *Minimalism: Designing simplicity*. Springer.
- Opel, D. (2014). Social justice in technologies of prenatal care: Toward a user centered approach to technical communication in home pregnancy testing. *Proceedings of the 32nd ACM International Conference on The Design of Communication*. ACM. <https://doi.org/10.1145/2666216.2666223>
- Oswal, S. K. (2014). Participatory design: Barriers and possibilities. *Communication Design Quarterly*, 2(3), 14–19. <https://doi.org/10.1145/2644448.2644452>
- Oswal, S. K. (2019). Breaking the exclusionary boundary between user experience and access: Steps toward making UX inclusive of users with disabilities. *Proceedings of the 37th ACM International Conference on the Design of Communication*. ACM. <https://doi.org/10.1145/3328020.3353957>

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- Palmeri, J. (2006). Disability studies, cultural analysis, and the critical practice of technical communication pedagogy. *Technical Communication Quarterly*, 15(1), 49–65. https://doi.org/10.1207/s15427625tcq1501_5
- Quesenberry, W. (2003). The five dimensions of usability. In M. J. Albers & B. Mazur (Eds.), *Content and complexity: Information design in technical communication* (pp. 81–102). Lawrence Erlbaum.
- Redish, J. (1989). Reading to learn to do. *IEEE Transactions on Professional Communication*, 32(4), 289–293. <https://doi.org/10.1109/47.44542>
- Redish, J. (2000). What is information design? *Technical Communication*, 47(2), 163–166.
- Redish, J. (2010). Technical communication and usability: Intertwined strands and mutual influences. *IEEE Transactions on Professional Communication*, 53(3), 191–201. <https://doi.org/10.1109/TPC.2010.2052861>
- Redish, J. (2012). *Letting go of the words: Writing web content that works* (2nd ed.). Morgan Kaufmann.
- Redish, J., & Barnum, C. (2011). Overlap, influence, intertwining: The interplay of UX and technical communication. *Journal of Usability Studies*, 6(3), 90–101.
- Redish, J., Chisnell, D. E., Laskowski, S. J., & Lowry, S. (2010). Plain language makes a difference when people vote. *Journal of Usability Studies*, 5(3), 81–103.
- Roberts, L. E. (2006). Using an access-centered design to improve accessibility: A primer for technical communicators. *Technical Communication*, 53(1), 14–22.
- Rose, E. J. (2016). Design as advocacy: Using a human-centered approach to investigate the needs of vulnerable populations. *Journal of Technical Writing and Communication*, 46(4), 427–445. <https://doi.org/10.1177/0047281616653494>
- Rose, E. J., Edenfield, A., Walton, R., Gonzales, L., McNair, A. S., Zhvotovska, T., Jones, N., de Mueller, G., & Moore, K. (2018). Social justice in UX: Centering marginalized users. *Proceedings of the 36th ACM International Conference on the Design of Communication*. ACM. <https://doi.org/10.1145/3233756.3233931>
- Rose, E. J., Racadio, R., Wong, K., Nguyen, S., Kim, J., & Zahler, A. (2017). Community-based user experience: Evaluating the usability of health insurance information with immigrant patients. *IEEE Transactions on Professional Communication*, 60(2), 214–231. <https://doi.org/10.1109/TPC.2017.2656698>
- Rosenbaum, S. (1989). Usability evaluations versus usability testing: When and why? *IEEE Transactions on Professional Communication*, 32(4), 210–216. <https://doi.org/10.1109/47.44533>
- Roy, D. (2013). Toward experience design: The changing face of technical communication. *Connexions • International Professional Communication Journal*, 1(1), 111–118.
- Rubin, J., & Chisnell, D. (2008). *Handbook of usability testing: How to plan, design, and conduct effective tests*. (2nd ed.). John Wiley & Sons.
- Salvo, M. J. (2001). Ethics of engagement: User-centered design and rhetorical methodology. *Technical Communication Quarterly*, 10(3), 273–290. https://doi.org/10.1207/s15427625tcq1003_3
- Sapp, D. A., & Crabtree, R. D. (2002). A laboratory in citizenship: Service learning in the technical communication classroom. *Technical Communication Quarterly*, 11(4), 411–432. https://doi.org/10.1207/s15427625tcq1104_3
- Saru, E. H., & Wojahn, P. (2020). “Glocalization” of health information: Considering design factors for mobile technologies in Malaysia. *Journal of Technical Writing and Communication*, 50(2), 187–206. <https://doi.org/10.1177/0047281620906131>
- Sauer, G. (2018). Applying usability and user experience within academic contexts: Why progress remains slow. *Technical Communication Quarterly*, 27(4), 362–371. <https://doi.org/10.1080/10572252.2018.1521637>
- Schneider, S. (2005). Usable pedagogies: Usability, rhetoric, and sociocultural pedagogy in the technical writing classroom. *Technical Communication Quarterly*, 14(4), 447–467. https://doi.org/10.1207/s15427625tcq1404_4
- Schrivier, K. A. (1993). Quality in document design: Issues and controversies. *Technical Communication*, 40(2), 239–257.
- Schrivier, K. A. (1997). *Dynamics in document design: Creating text for readers*. John Wiley & Sons.

- Schrivver, K. A. (2001). Response in “what is a name?” *Design Matters*, 5(2), 8.
- Schrivver, K. A. (2017). Plain language in the US gains momentum: 1940–2015. *IEEE Transactions on Professional Communication*, 60(4), 343–383. <https://doi.org/10.1109/TPC.2017.2765118>
- Scott, J. B. (2008). The practice of usability: Teaching user engagement through service-learning. *Technical Communication Quarterly*, 17(4), 381–412. <https://doi.org/10.1080/10572250802324929>
- Sedgwick, J. (1993). The complexity problem. *Atlantic Monthly*, 270(3), 96–104.
- Sharp, H., Rogers, Y., & Preece, J. (2019). *Interaction design: Beyond human-computer interaction* (5th ed.). John Wiley & Sons.
- Shivers-McNair, A., & San Diego, C. (2017). Localizing communities, goals, communication, and inclusion: A collaborative approach. *Technical Communication*, 64(2), 97–112.
- Shneiderman, B., Plaisant, C., Cohen, M., Jacobs, S., Elmqvist, N., & Diakopoulos, N. (2018). *Designing the user interface: Strategies for effective human-computer interaction* (6th ed.). Pearson.
- Simmons, W. M. (2007). *Participation and power: Civic discourse in environmental policy decisions*. SUNY Press.
- Simmons, W. M., & Zoetewey, M. W. (2012). Productive usability: Fostering civic engagement and creating more useful online spaces for public deliberation. *Technical Communication Quarterly*, 21(3), 251–276. <https://doi.org/10.1080/10572252.2012.673953>
- Spinuzzi, C. (2000). Exploring the blind spot: Audience, purpose, and context in “product, process, and profit.” *ACM Journal of Computer Documentation (JCD)*, 24(4), 213–219.
- Spinuzzi, C. (2001). Grappling with distributed usability: A cultural-historical examination of documentation genres over four decades. *Journal of Technical Writing and Communication*, 31(1), 41–59. <https://doi.org/10.2190/8gbc-j04r-vkcf-njjp>
- Spinuzzi, C. (2003). *Tracing genres through organizations: A sociocultural approach to information design*. MIT Press.
- Spinuzzi, C. (2005). The methodology of participatory design. *Technical Communication*, 52(2), 163–174.
- St.Amant, K. (2009). The role of rhetoric in localization and offshoring. In V. E. Ferragline, J. H. Doorn, & L. C. Rivero (Eds.), *Handbook of research on innovations in database technologies and applications: Current and future trends* (pp. 844–851). Information Science Reference.
- St.Amant, K. (2011). Thinking globally, teaching locally: Understanding the changing nature of technical communication in an age of globalization. In B. Thatcher & K. St.Amant (Eds.), *Teaching intercultural rhetoric and technical communication: Theories, curriculum, pedagogies, and practices* (pp. 1–11). Baywood.
- St.Amant, K. (2015). Introduction to the special issue: Cultural considerations for communication design: Integrating ideas of culture, communication, and context into user experience design. *Communication Design Quarterly*, 4(1), 6–22. <https://doi.org/10.1145/2875501.2875502>
- St.Amant, K. (2017a). Of scripts and prototypes: A two-part approach to user experience design for international contexts. *Technical Communication*, 64(2), 113–125.
- St.Amant, K. (2017b). Scripting the context of content strategy: A script-theory approach to user-centered design in content strategy. *Proceedings of the European Academic Colloquium on Technical Communication 2017*, 23–36.
- St.Amant, K., & Graham, S. S. (2019). Research that resonates: A perspective on durable and portable approaches to scholarship in technical communication and rhetoric of science. *Technical Communication Quarterly*, 28(2), 99–111. [doi:10.1080/10572252.2019.1591118](https://doi.org/10.1080/10572252.2019.1591118)
- Stephens, S. H., & DeLorme, D. E. (2019). A framework for user agency during development of interactive risk visualization tools. *Technical Communication Quarterly*, 28(4), 391–406. <https://doi.org/10.1080/10572252.2019.1618498>
- Suchman, L. (2002). Located accountabilities in technology production. *Scandinavian Journal of Information Systems*, 14(2), 91–105.
- Sullivan, P. (1989). Beyond a narrow conception of usability testing. *IEEE Transactions on Professional Communication*, 32(4), 256–264. <https://doi.org/10.1109/47.44537>

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- Sun, H. (2006). The triumph of users: Achieving cultural usability goals with user localization. *Technical Communication Quarterly*, 15(4), 457–481. https://doi.org/10.1207/s15427625tcq1504_3
- Sun, H. (2012). *Cross-cultural technology design: Creating culture-sensitive technology for local users*. Oxford University Press.
- Sun, H. (2020). *Global social media design: Bridging differences across cultures*. Oxford University Press.
- Sun, H., & Getto, G. (2017). Localizing user experience: Strategies, practices, and techniques for culturally sensitive design. *Technical Communication*, 64(2), 89–94.
- Theofanos, M. F., & Redish, J. (2003). Guidelines for accessible and usable web sites: Observing users who work with screen readers. *Interactions*, 10(6), 38–51.
- Theofanos, M. F., & Redish, J. (2005). Helping low-vision and other users with web sites that meet their needs: Is one site for all feasible? *Technical Communication*, 52(1), 9–20.
- Torraco, R. J. (2005). Writing integrative literature reviews: Guidelines and examples. *Human Resource Development Review*, 4(3), 356–367. <https://doi.org/10.1177/1534484305278283>
- Torraco, R. J. (2016). Writing integrative literature reviews: Using the past and present to explore the future. *Human Resource Development Review*, 15(4), 404–428. <https://doi.org/10.1177/1534484316671606>
- van der Meij, H. (2003). Minimalism revisited. *Document Design*, 4(3), 212–233.
- van der Meij, H., & Carroll, J. M. (1995). Principles and heuristics for designing minimalist instruction. *Technical Communication*, 42(2), 243–261.
- Walton, R. (2016). Supporting human dignity and human rights: A call to adopt the first principle of human-centered design. *Journal of Technical Writing and Communication*, 46(4), 402–426. <https://doi.org/10.1177/0047281616653496>
- Walton, R., & Jones, N. N. (2013). Navigating increasingly cross-cultural, cross-disciplinary, and cross-organizational contexts to support social justice. *Communication Design Quarterly*, 1(4), 31–35. <https://doi.org/10.1145/2524248.2524257>
- Walton, R., Moore, K., & Jones, N. (2019). *Technical communication after the social justice turn: Building coalitions for action*. Routledge.
- Wharton, C., Rieman, J., Lewis, C., & Polson, P. (1994). The cognitive walkthrough method: A practitioner's guide. In J. Nielsen & R. L. Mack (Eds.), *Usability inspection methods* (pp. 105–140). John Wiley and Sons.
- Whiteside, J., Bennett, J., & Holtzblatt, K. (1988). Usability engineering: Our experience and evolution. In H. M. G. (Ed.), *Handbook of human-computer interaction* (pp. 791–817). Amsterdam, North-Holland: Elsevier Science B. V.
- Willerton, R. (2015). *Plain language and ethical action: A dialogic approach to technical content in the 21st century*. Routledge.
- Williams, S. D. (2007). User experience design for technical communication: Expanding our notions of quality information design. *Proceedings of the Annual Meeting of the IEEE Professional Communication Society*. IEEE. <https://doi.org/10.1109/IPCC.2007.4464076>
- Yeats, D., & Carter, L. (2005). The role of the highlights video in usability testing: Rhetorical and generic expectations. *Technical Communication*, 52(2), 156–162.
- Yunker, J. (2003). *Beyond borders: Web globalization strategies*. New Riders.
- Zachry, M., & Spyridakis, J. H. (2016). Human-centered design and the field of technical communication. *Journal of Technical Writing and Communication*, 46(4), 392–401. <https://doi.org/10.1177/0047281616653497>
- Zhou, Q. (2014). That usability course: What technical communication programs get wrong about usability and how to fix it. *Communication Design Quarterly*, 2(3), 25–27. <https://doi.org/10.1145/2644448.2644454>

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Context, Cognition, and the Dynamics of Design Thinking: Cognitive Methods for Understanding the Situational Variables Affecting Usable Design

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By Kirk St.Amant

ABSTRACT

Purpose: Design thinking is a process for identifying solutions to problems in certain contexts. The better one understands contextual factors affecting use and interaction, the more effectively one can use design thinking to address issues at the context and greater systems levels. This article examines how the cognitive science concepts of scripts and prototypes can help realize the potential of design thinking in different settings.

Method: This article compares design thinking approaches for understanding context to concepts of context as examined in the cognitive mechanisms of prototypes and scripts. Through this comparison, the author explains how to integrate scripts and prototypes into design thinking processes in order to enhance understandings of context and the success of design thinking approaches to context-related problems.

Results: The article reveals that prototypes and scripts can expand design thinking approaches and enhance the development of design solutions for addressing problems at local and greater systems levels.

Conclusions: Technical communicators can use the approach presented here to enhance design thinking processes in order to better address problems in or design products for specific contexts.

KEYWORDS: applied theory, cognition, context, design thinking, usability

Practitioner's Takeaway

- An understanding of the psychological processes behind usability in different settings can help technical communicators better research user expectations associated with different settings.
- A mechanism that helps technical communicators focus research on cognitive expectations of usability in a context can help them better identify such factors.
- An approach for integrating cognitive theory into design thinking processes can help technical communicators better apply design thinking to address problems in and create products for different environments.

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CONTEXT AND DESIGN

Context often affects usability, for the setting where individuals perform activities can influence the use of items. Technical communicators can apply an understanding such context dynamics to create more usable designs. Doing so involves observing situations to identify where problems or needs occur and then developing prospective solutions. Such situations have led observation-based approaches like design thinking to become an increasingly prevalent method for problem solving and product development in different situations.

Essentially, design thinking combines observation with the rapid creation and testing of solutions to develop new technologies and processes (Brown, 2008; Kleiner, 2009; Owen, 2006). The better technical communicators can observe settings and identify problems or needs, the more effectively they can design usable products and effective approaches. The cognitive concepts of scripts and prototypes can assist technical communicators with such activities. This article examines what these cognitive mechanisms are and how to integrate them into design thinking when developing processes or products.

COGNITION, PROCESSING, AND ORGANIZING

The human brain is often likened to a computer. This comparison references the brain's continual organizing and processing of input to achieve a particular—ideally, desired—output (Your Brain, 2017; Sweller, 1988; Schmidt, 1975). The problem for brains and computer alike involves the information they can address at one time (Sweller, 1988; Paas, Renkl, & Sweller, 2004). For humans, the challenge requires balancing input from the senses against the information the brain can process.

Some estimates set the information the senses channel to the brain at millions of bits per second (Wu et al., 2016). Yet neurobiological factors limit the new information the brain can process at any moment (Marois & Ivanoff, 2005; Kirschner, 2002; van Merriënboer & Sweller, 2005). This situation often involves split attention—or how humans balance what to pay attention to and process in a context (Cave, Bush, & Taylor, 2010). Researchers often label this processing limit *cognitive load* (Sweller, 1988;

Paas, Renkl, & Sweller, 2004). From a computing perspective, the situation resembles information overload where data is coming in faster than the system can address it. From a cognition perspective, individuals often refer to this situation as *cognitive overload* (Wu et al., 2016; Paas, Renkl, & Sweller, 2004). In both cases, this overload often results in a system shutdown.

These instances raise the question: How can individuals interact on a daily basis? The answer is human brains have developed cognitive mechanisms that focus the brain's attention and its processing power on a fraction of the information the senses take in (Kirschner, 2002; van Merriënboer & Sweller, 2005; Sweller, 1988). This approach affects what individuals pay attention to and how they aggregate sensory data for easier cognitive processing (Sweller, 1988; Paas, Renkl, & Sweller, 2004; Postle, 2016). Such activities often involve a cognitive construct called *schemas*.

SCHEMAS AND PROCESSING

A schema is a mental model for organizing information into blocks based upon common relationships (Pass, Renkl, & Sweller, 2003; Cook, 2006; van Merriënboer & Sweller, 2010). Specifically, a schema combines the aspects individuals associate with an item into a single interconnected unit for mental processing (Sweller, 1988; Tse et al., 2007; Yamada & Itsukushima, 2013). If, for example, one hears or reads the word “pen,” a variety of things often come to mind including:

- activities associated with using a pen (e.g., writing, taking notes, taking a test, etc.);
- kinds of pens (e.g., fountain, ball-point, erasable, etc.);
- contexts where one uses a pen (e.g., office, classroom, bank, etc.); and
- objects with which one uses a pen (e.g., paper, note pads, post-it notes, etc.).

The mind simultaneously accesses these items because the brain has organized them into one unit for mental processing—a schema associated with “pen.” When individuals encounter the word “pen,” their brain accesses the related schema of these associated factors because they exist as a single interconnected unit (Pass, Renkl, & Sweller, 2003; Cook, 2006; van Merriënboer & Sweller, 2010).

By packaging information into such conglomerate units, schemas reduce the data the brain needs to process and help manage cognitive load (Sweller, 1988; Tse et al., 2007; Yamada & Itsukushima, 2013).

These schematic relationships also affect how individuals perceive information. Imagine someone asks you to get a pen from a location. Your mind will likely be primed to enter that space searching for items you associate with your schema for pen. These items could include a writing-related task to perform, materials to write on, and places where one writes. In this way, schemas focus attention and reduce the information the brain needs to consider (Sweller, 1988; Postle, 2016; Yamada & Itsukushima, 2013).

These schemas are not innate. Rather, individuals learn them through exposure over time (Sweller, 1988; Tse et al., 2007; Yamada & Itsukushima, 2013). The more one sees a pen used for writing, the stronger that relationship becomes in one's schema for pen. Similarly, the more one sees pens used with paper, the more one associates the two in a schematic relationship. As a result, the idea of "paper" can access both "pen" and its related schema as easily as the word "pen" can access the schema associated with paper and so on. This dynamic means the schema individuals use can evolve to address new items they encounter in an environment (Tse et al., 2007; Yamada & Itsukushima, 2013).

These connections between context, perception, and expectation mean schemas help with understanding problems in a particular context—such as when a schema does not match the setting where it is used. Similarly, schemas can help identify context-related needs. Consider a situation where an individual's schema for "writing" in a space contains "paper." If there is no paper in a location, then that situation becomes a need to identify and address to help that person perform writing tasks in that setting. In these ways, schemas can help individuals observe contexts to identify issues and design solutions for addressing them. These factors also mean schemas can play an important role in design thinking where observation is central to identifying problems and needs.

DESIGN THINKING

At its core, design thinking involves observing how persons perform a task in a location. The objective is to identify problems or find areas for improvements

(Brown, 2008; Kleiner, 2009; Owen, 2006; Buchanan, 1992). Such observation helps in discovering new items or advantages no one realized were needed or beneficial.

After identifying a want or need, the next step in the design thinking is rapid prototyping where individuals create an initial design (i.e., a prototype) of a technology or approach to address the related problem or need (Brown, 2008; Kleiner, 2009; Owen, 2006). Members of the target audience (those who were observed) then try to use the prototype solution in the related location.

This initial prototype likely won't perfectly match the related need or problem. Rather, the initial design facilitates a second round of observation to assess how the target audience uses that initial item or approach in the associated setting. This second round of observations allows product/solution designers to quickly modify designs or approaches to better address audience expectations and perceptions (Brown, 2008; Kleiner, 2009; Owen, 2006). Members of the target audience then try to use the revised design/approach, and product/solution designers again observe such activities to determine if additional modifications are required. If needed, such modifications are made, and the newly revised design or approach is tested again. This iterative process of observe-(re)design-test eventually leads to a final design that addresses the related problem or need (Brown, 2008; Kleiner, 2009; Owen, 2006; Buchanan, 1992).

This overall process involves three core phases:

- **Inspiration:** The initial phase when observation identifies problems in a system or prospective needs associated with a context.
- **Ideation:** The second phase where rapid prototyping helps devise prospective solutions and iterative, observation-based testing and revision identifies an effective solution.
- **Implementation:** The final phase where individuals chart a path for integrating the identified solution across the greater system where individuals will use it (Brown, 2008).

This process combines the study of users with design to address the contexts where activities occur and the overall system in which such contexts exist.

Designers and content creators can apply this approach with individuals from different backgrounds to address different contextual needs and problems (Kleiner, 2009; Buchanan, 1992). Additionally, the

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speed with which individuals can test and design prototypes allows for relatively quick product or process development that reflect the context-based experiences of audiences (Brown, 2008; Owen, 2006; Buchanan, 1992). For these reasons, design thinking has become an increasingly important method for examining everything from business practices to engineering research to educational approaches (see, for example, Newman et al., 2015; Mentzer, 2014; Dym et al., 2005). Such applications have prompted technical communicators to also examine design thinking in their own product design, teaching approaches, and curriculum development practices (see Shalamova, 2016; Wickman, 2014; Purdy, 2014). Accordingly, aspects that can enhance design thinking approaches have much to offer different industries and fields. An application of schemas can help with such processes.

Design thinking's observation-based, iterative approach reflects two central factors of cognition:

- knowing what to observe in order to understand the behavior in a location and identify related problems or needs
- focusing observation on how individuals use prototype solutions in a setting

Such focused observation can help in revising designs so audiences can easily recognize and use a new item or approach in a setting. These processes involve two particular schemas: scripts and prototypes.

SCRIPTS AND PROTOTYPES

Many daily activities require individuals to navigate several variables. Most involve identifying items and individuals in a location and engaging with these items and individuals in a recognized way to achieve a particular objective in that context. The ease with which humans perform such processes often involves the schemas of scripts and prototypes.

Scripts, Contexts, and Behavior

Certain schemas contain associations for the actions individuals repeatedly perform in a location. When you enter a restaurant, for example, you generally know what events will take place there and the sequence in which they will occur. (You will be seated, place an order, receive food, pay, and depart.) You also know who will play a central role in such events. (You will interact with a greeter who seats you and waitstaff who take your order.) Additionally, you can anticipate what

items will be in that space to facilitate such activities. (You know you will encounter menus for selecting food, pen and paper waitstaff will use to take your order, utensils you will use when eating, etc.) These (inter) associated factors for this location represent a single schema known as a *script*.

Like most schema, scripts combine certain elements into a single cognitive unit to help individuals quickly and easily process large amounts of information (Tomkins, 1978 & 1987; Norman, 2002; St.Amant, 2017). As such, scripts prevent cognitive overload whenever individuals move through various contexts in their daily lives. In so doing, scripts help individuals identify factors essential to achieving an objective in a location. If those factors are present, individuals can easily perform the complex actions associated with achieving that objective (e.g., eating at a restaurant). If factors are missing, however, individuals can become confused and disoriented as they grapple with what information to process and how—a situation that increases cognitive load.

Central script elements include:

- **Sequence:** The order in which the actions/events in a space occur in relation to accomplishing the objective one wishes to achieve in that context.
- **Roles:** The individuals one expects to encounter and play a role in achieving that person's objective for being in that context.
- **Props:** The items one expects to encounter and use and expects others (i.e., the other roles) to have and use to complete activities in a context.
- **Entry Conditions:** The ways individuals, materials, and information enter a location including how persons, materials, and information not present can enter/be brought into that setting if needed.
- **Exit Conditions:** The ways individuals, materials, and information leave or can be sent from that context including how to send items or information out of that location if needed. (Tomkins, 1978 & 1987; Schank & Abelson, 1977)

These script-related factors become the variables individuals expect to encounter and interact with in a context. They are also foundational to the schemas individuals use to guide their actions in a location and shape their expectations of what they will encounter and can do in that setting. In these ways, script-related factors determine the sensory information individuals focus on in a location.

If these expected variables are present, individuals can readily perform complex actions in that setting as their associated script guides what to focus on and use and whom to interact with in that context. If, however, one or more of these variables is missing, individuals often become unsure of how to act or what to do. In such cases, persons generally search their surroundings for the missing item in order to continue the process per the related script. Individuals might also seek guidance or explanation from others there to determine what to do based on the absence of a script-related variable.

If, for example, individuals enter a room but don't know where they are or what they are expected to do in a location, they often:

- wait until they find a marker (e.g., a sign) identifying the location and then initiate the related script; or
- locate someone who can identify that space (e.g., "It's a restaurant.") in order to access the desired script.

Even then, without certain props/variables that indicate how to proceed in that context, breakdowns can occur. (What do individuals do if they cannot find a sign or person to clarify if one should "wait to be seated" or to "seat yourself" upon entering a restaurant?) In such situations, individuals might do nothing and wait for someone to explain how to proceed. Alternatively, individuals might watch other persons to determine what those individuals do in that location and then mimic that behavior while hoping such actions are correct. These expectations of the script variables individuals expect to encounter involve another schema: *prototypes*.

Prototypes, Identification, and Action

Accessing the desired schema for a process often involves identifying the items in that schema in order to access the desired process for something. The process generally works as follows: If I tell you to "Find a cup" in a space, your mind will access a mental model—perhaps an image—for "cup," and you will survey your surroundings to identify objects that resemble that model. The more closely something in that location mirrors your mental representation for "cup," the more readily you can identify the item you are seeking and achieve your purpose for being in that location (St.Amant, 2017).

Upon finding the cup, you generally know how to use it. If I ask, "Please go into a location and use the cup you find there to get coffee for a guest," I don't need to explain how cups are used for holding fluids. Similarly, I don't need to provide instruction on how to pour liquids into a cup or carry the cup by the handle if the contents are hot. Rather, I assume that once you've identified a cup (i.e., recognition) you understand what it is used for and how to use it (i.e., attribution). This ability to readily identify and use items in a context involves a particular schema—a *prototype*—that connects the identification of an item to its associated use(s).

Like other schemas, prototypes combine complex pieces of information into a single cognitive unit for processing. Specifically, prototypes combine the features or characteristics of an item into a model of what the overall item should resemble (Rosch, 1978; Aitchison, 1994; St.Amant, 2005). As such, prototypes:

- help individuals identify objects by noting, "If an object has these characteristics, then it resembles and should be identified as X." Per a classic example from Aitchison (1994), if an item has feathers, wings, and a beak, most individuals recognize it as a bird.; and
- tell individuals what objects to search for in a context by focusing attention on items that have the characteristics they associate with a particular object. Per Aitchison's (1994) example, if I say, "Go into that room and find the bird," you will likely enter that space and search for an object with feathers, wings, and a beak—the characteristics of a prototypical bird.

Additionally, prototypes combine certain attributional aspects into the expectations individuals associate with an object. The reason you know cups are used to hold fluids is because that characteristic (vessel used to hold liquids) is part of the overall prototype you have for cup (Aitchison, 1994; St.Amant, 2005). Similarly, the factors associated with a cup's uses such as cups usually have handles that help individuals avoid burning their hands if contents are hot are also part of this prototype for "cup."

The prototype individuals have for an item also contains information on the appropriateness of an item (Aitchison, 1994; St.Amant, 2005). A square vessel, for example, could be a kind of cup one might recognize. It is not, however, a typical cup and would probably

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be considered an oddity in most situations where one expects to encounter cups. In such cases, individuals might recognize what the object is and what it does, but it would likely be seen as a different, unexpected, and even inappropriate version of the item to use in certain contexts (e.g., formal business events).

In most situations, scripts and prototypes are entwined so individuals can perform regular activities reflexively (St.Amant, 2017). In these situations, scripts identify what individuals will do, who they will encounter, and what they will encounter. They also identify how items can enter or exit a context. Prototypes, in turn, help individuals identify and use expected items or identify and interact with expected persons in that setting according to the related script. Similarly, prototypes help individuals identify mechanisms for bringing items into or sending items out of that context per the related script. An individual's prototype for cell phone, for example, tells them what to locate if they wish to call out to access information when in certain places. Similarly, that prototype tells individuals what mechanisms others can use to call in to a setting in order to provide needed information.

For individuals engaged in design thinking, scripts and prototypes can facilitate the observation of different contexts. They can also help with the creation of initial products or processes to address problems or meet needs in a setting. These benefits involve:

- identifying key elements associated with activities in a setting; and
- creating materials audiences can easily identify and use in a context

This integration of scripts and prototypes into design thinking can occur in four ways: mapping, aligning, designing, and systematizing.

INTEGRATING COGNITIVE FACTORS INTO DESIGN THINKING APPROACHES

Connecting cognitive concepts to design thinking involves integrating prototypes and scripts into the observation and understanding processes to:

- first, determine the parts of the process being observed.
- next, identify the variables affecting activities in each part.

I call this process *script mapping* (St.Amant, 2017).

Mapping

Scripts organize an activity into a sequence of events (i.e., steps) with certain actions preceding others. Each step contains variables for performing the activities expected in that step. These variables include the individuals who perform certain tasks at each step (roles) and the materials they expect to use (props) for these tasks. These expectations include the means and methods for:

- obtaining or bringing needed items or information into that context (entry conditions); and
- transmitting/sending needed items or information from that context (exit conditions).

Script mapping involves first identifying the major actions or steps in the overall script for that context and then identifying the variables expected for each step.

Integrating script mapping into design thinking begins with identifying the steps in the overall sequence/process of a script. This situation might resemble Table 1.

Table 1. Script for Ordering at a Restaurant

Step 1	Step 2	Step 3	Step 4
Being seated	Placing order	Receiving food	Paying and departing

During the initial observations phase of design thinking, one would note (and document) the steps in the process being observed.

The next aspect becomes identifying the script-related variables observed at each step. This round of mapping might resemble Table 2.

Table 2. Map of a Script Sequence

Step 1:	Step 2:	Step 3:	Step 4:
Roles • Props (used in role)	Roles • Props (used in role)	Roles • Props (used in role)	Roles • Props (used in role)
Entry conditions	Entry conditions	Entry conditions	Entry conditions
Exit conditions	Exit conditions	Exit conditions	Exit conditions

To use the restaurant example, this mapping might resemble Table 3.

Table 3. Script for Ordering at a Restaurant

Being seated	Placing order	Receiving food	Paying and departing
Greeter • Menus Customer • Table • Chairs • Dishes	Customer • Menu • Table • Chairs • Dishes Waitstaff • Pen • Paper	Customer • Table • Chairs • Dishes Waitstaff • Food and drink	Waitstaff • Bill • Receipt Customer • Payment • Receipt
Obtains info: Greeter seats customers (seating information); Greeter provides customers with menus (order/menu options/information)	Obtains info: Customer uses menus (Waitstaff takes menu after taking order)	Obtains items: Waitstaff brings food and drink to customer Obtains info: Waitstaff asks customer if s/he needs anything else	Obtains info: Waitstaff asks if anything else Obtains items: Waitstaff presents bill to customer Customer presents payment method to waitstaff Waitstaff presents receipt to customer
Sends info: Greeter contacts waitstaff to attend to customers	Sends info: Waitstaff writes down on pad and takes to kitchen	Sends info: Waitstaff writes down/transmits additional order to kitchen (if any)	Sends info: Waitstaff takes payment method to cashier area

Creating script maps of observed processes can enhance design thinking by identifying where problems might occur or where to address a need.

Per the restaurant example, script-based observations might identify if part of the overall process seems to be missing. One might notice no formal step exists for providing food to the customer; this situation could result in customers experiencing different levels of quality when receiving their food. In other cases, mapping could identify unnoticed needs. For example, the mapping of “ordering at a restaurant” could reveal printed “Menus” provided by a “Greeter” are the only way customers can access information on meal options. This observation could identify an unnoticed need (e.g., the need for other ways to check menu options). It could also identify a space for introducing a new approach when addressing this need. In the menu example, the design solution might involve creating an app that allows customers to check the menu via mobile phone at any time. This step could save time and increase customer satisfaction by reducing dependence on waitstaff to provide customers with printed menus.

Aligning

To interact in a context, individuals often need a common understanding of:

- what all parties are expected to do in a setting; and
- what items individuals are expected to use to perform these tasks in that setting.

Disconnects involving such factors can create confusion and cause problems. They can also reveal needs for new materials such as items that clarify the roles of individuals.

The issue involves alignment. Essentially, one needs to confirm the scripts of all parties interacting in a location are common, or aligned, per the expected script variables. One must also confirm the use of common characteristics for identifying variables within a script. Design thinking can make meaningful contributions in these situations. These situations also represent instances where unseen problems can occur, or unanticipated needs might arise—areas where script mapping can provide important design insights.

Such processes help determine if all parties use a common script to guide behaviors and interact with others in a setting. The context-based script map researchers create can help examine such factors. The goal is to a) create a map of the script each party has for interacting in a location and then b) compare these

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maps to determine if discrepancies in script expectations exist. Such a comparison could reveal disconnects in what the persons think they—or others—should do in a context. For example, a comparison of script maps for ordering at a restaurant might reveal the restaurant's owners expect customers to ask a greeter about seating preferences upon entering. Yet the maps of customers might indicate they do not realize they need to do so unless prompted by a sign stating, "Please wait to be seated." The resulting problem is some customers seat themselves upon entry—which affects how greeters and waitstaff identify available tables and determine which waitstaff serve particular patrons. The script mapping and comparison process here identifies a new design need: A sign stating seating policy.

Aligning the divergent scripts of owner and of customer involves creating a new item (e.g., a sign stating seating policy) to address a need previously unrecognized by one script. This item, the design solution of a sign stating seating policy, could be developed and user tested to:

- identify a final design that is recognized (i.e., prototypes); and
- determine where to place that design so individuals can locate it (i.e., script).

The result is a product that addresses the user needs and design expectations for that context.

In other cases, the prototypes within a script could cause problems design thinking can resolve. All involved individuals, for example, might have common expectations of the variables they expect to encounter at different steps within a script. However, what a particular variable should resemble might differ from person to person. Such variations could affect how individuals interact in and what they do in a context.

Consider the example of waitstaff in the script for restaurant. The customer, the owner, and the waitstaff at a restaurant might have a common role expectation that a waitperson takes customer orders and attends to customers. Yet these parties might have different ideas of the prototype for "waitperson"—specifically what characteristics identify individuals as "waitstaff" in that script. The owner and the waitstaff might think persons dressed in street clothes and carrying a pad and pen sufficiently identifies "waitstaff" in that context. Customers, however, might expect a certain dress (e.g., white shirts with black pants) to be the characteristics identifying "waitstaff" in that script. As such, customers

might be unable to identify waitstaff when needed in this situation. This situation could lead to delayed service and customer dissatisfaction that might affect the related organization (e.g., poor customer reviews).

Addressing this problem involves a design solution that lets all involved readily identify roles related to performing expected activities in that context. Per the restaurant example, this design solution could involve implementing a uniform policy for waitstaff. From a design thinking perspective, it is a situation where one's observations identify a problem by understanding how prototypes can cause confusion in a context. This situation also involves applying an understanding of prototypes to develop a design solution that address a problem.

Designing

In design thinking practices, after individuals identify a problem or need, they do rapid prototyping—a process of creating a rough design of a proposed solution. Individuals next test this initial design with the related users to collect feedback and identify modifications needed to make the design more usable. Individuals then create and test a revised design, and this process of test, revise, test again, etc. continues until testing results identify an effective design.

For designs to be effective, users need to identify what an item is (recognizability) in order to understand how to use the related design. If, for example, the online menu one creates for a restaurant has features that resemble a conventional menu (e.g., meal option, description, and related price), it might be easier for patrons to recognize that item as a menu and know how to use it at that restaurant. If, however, the design makes that online menu look like something else (e.g., a video game where users compete to access menu options), customers might experience difficulty recognizing what that item is and understanding how to use it.

The ability to use an item often involves how well individuals understand its relationship to the context for which it has been designed (contextualization). Per the menu example: To address an identified need, one might create a digital menu for ordering at a restaurant. If the user does not understand how this digital option fits into the process of ordering a meal (e.g., Does one view it before ordering to check options? After the order arrives to confirm it is correct?) that person will be less likely to use it. This situation results from the user not

knowing how this new item connects to the context where this overall process occurs. Prototypes and scripts can help address such situations

One must first consider contextualization—or at what point to integrate a new item into an existing process. Knowing where in the process individuals will use the new object lets one understand how to design that item to fit into that process. A restaurant owner, for example, might know customers will access the restaurant's digital menu upon receiving their order to confirm the meal is correct. One might design the menu's interface to display both:

- the entry as it appeared on the menu from which customers ordered; and
- the order as it was received by the chef.

This design allows customers to confirm that the order they made and the order the chef received aligned. The resulting design contextualizes this new online menu to address the script expectations patrons have at that point in the overall sequence of events, and the resulting design better meets the user's needs. I call this application of scripts to integrate design solutions into an existing script process *script transfer*. The idea is to design new items users can readily transfer into or integrate into an existing script they have.

Schema-related prototypes can help with these design processes. As noted, users identify items based on how closely the features of an item match the prototype for an object the users know and recognize (Rosch, 1978; Aitchison, 1994). Upon identifying an item, users also determine what that item does and how to use it. If a new design has enough features in common with recognized prototypes, it is easier for users to identify what that item is (recognizability) and understand what that object does and how to use it (attribution). From a design thinking perspective, the process involves determining the characteristics new items must possess to match the existing prototypes users rely on to identify items and determine their use. Additionally, such prototype matches in design can help users contextualize new items within an existing script based upon what actions one performs at a particular point in a process.

To achieve these design objectives, individuals might begin design thinking's development and design phase by asking users to note features they associate with certain items. (For creating a digital menu, this process could involve asking questions like, "What

characteristics do you use to determine that something is a menu?") The design of the initial product would then include these features, and one would test this design by asking users:

- if they know what the item is
- if they know what the item is used for
- if they know how to use the item

Each step has users note the characteristics or features they associate with identifying what a new item is (e.g., "If I wanted to revise this item to look more like a menu, what would I need to add? To remove? To modify?") Such processes help align the design of new items with user expectations and help users identify what an item is, what it does, and how to use it within the related script. Ideally, such testing can lead to the development of a product individuals can readily recognize and use in the related context.

Systematizing

Design thinking encompasses both creating new items for a process and viewing processes as part of a greater system in which individuals use such items. The idea involves developing a new product and considering how to integrate that product into an organization's marketing strategies and associated logistics of production and transportation (Brown, 2008; Kleiner, 2009; Owen, 2006; Buchanan, 1992). Thus, design thinking integrates systems thinking into the design and development processes, and scripts and prototypes can facilitate such practices.

Transferring new ideas/products from one domain to another involves the script concepts of exit and entry conditions. Essentially, certain factors govern how individuals expect items and materials to exit one context and enter another. When materials move from context—or script—to context, they straddle an area where exit and entry conditions overlap. In a restaurant setting, for example, how an order leaves the dining area (exit conditions) to go to the kitchen for processing represents how meal requests from the dining room enter the context of the kitchen (entry conditions). Here, exit and entry conditions overlap as items or information must move from one context to another within the overall system. This situation involves particular props—the written order for the meal—traversing two contexts.

These factors mean certain items can be *transitional items*—or mechanisms used to pass information or

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materials from one context to another in a greater system (i.e., exit one, enter another). If individuals can identify such transitional items, they can better create and test draft designs with two groups:

1. The users who consider these items connected to exit conditions (i.e., sending items and information out of a context)
2. The users who associate these items with entry conditions (i.e., items used to bring new, needed information into a context)

Testing the same item/design with both groups helps determine if each group recognizes what that item is and knows how to use it within the greater context of events.

Per the example of ordering a meal, both waitstaff and kitchen staff need to recognize what a slip with a meal order is to use that item to convey information from one context (i.e., dining room) to another (i.e., kitchen) within the overall system of a restaurant. The waitstaff must recognize such a slip as central to exit conditions (i.e., sending the order out of the dining room). Kitchen staff must recognize that slip as central to entry conditions (i.e., sending information into the kitchen). For this reason, both groups need to correctly recognize the same item (i.e., a slip with a meal order) as well as correctly associate that item with a related script (i.e., sending an order to the kitchen or receiving an order from the dining room). So, related testing of the design of that item must include members from both groups with each group confirming the design of that item connects to the correct script within a greater system. (For waitstaff, this connection would be to sending an order to the kitchen; for kitchen staff, it would be receiving an order from the dining room.)

Addressing such design factors involves the schema of prototypes. Each group in such exit-enter transitions must note the characteristics used to identify what the item is to know how to use it. Design thinkers can then apply this prototype-related information to create designs containing characteristics each group needs to identify and use materials. The resulting design can help items and information move easily from context to context within a greater system.

In such cases, script mapping helps identify context factors affecting if and how individuals use a new product. Essentially, mapping helps identify where scripts overlap along the *exit/entry condition boundary*. Design thinkers can then create materials, track how

they move across a system, and determine essential the prototype expectations so all individuals involved in a process can recognize these items during such movements.

Such mapping can also help anticipate where to develop new services or products individuals can use across script contexts. Imagine someone wanted to develop an online menu that allows customers in the script “restaurant dining area” to order a meal. Doing so means providing related service for supporting this new technology—services that require modifying a script for “provide technical support.” The design thinker would therefore need to modify this *affiliated script*—or script a new product now connects to another context. If, for example, someone added an online menu to the script for “dining at a restaurant,” that person would also need to modify a related script for “provide technical support” (i.e., expanding an existing script for technical support to include providing such support for this new online menu). Doing so might also mean creating materials for this affiliated script (e.g., a manual on how to provide technical support for this new menu).

EXAMPLE APPLICATION IN SOCIETY

Drive-through COVID-19 testing represent an example of integrating script mapping into design thinking to create innovative solutions (St.Amant, 2021). In early COVID-19 situations, many societies needed to do large-scale disease testing effectively, efficiently, and safely. Such practices had to integrate easily into:

- the everyday lives of individuals to achieve the scale of testing needed; and
- the infrastructure of a society to avoid overwhelming existing medical facilities.

One solution was drive-through testing stations. Essentially, different national health authorities developed a design solution involving a new script. The result was a testing method that integrated effectively into greater society without straining healthcare facilities or requiring radical changes in individuals’ daily lives.

Drive-through testing stations addressed script elements by creating experiences that matched existing expectations individuals associated with certain contexts. The new testing process began with entry conditions—signs indicating where and how to enter a drive-through testing station (e.g., “Enter

here for COVID-19 testing”). Individuals then often encountered factors that established roles in this script:

- a sign instructing individuals to remain in their cars (i.e., indicator of role of individual) and noting only drivers would receive testing (i.e., identifying role of any passengers)
- a PPE-clad healthcare worker (i.e., roles as identified by prototype for who “healthcare workers” are) who did the testing

Generally, these facilities noted the props parties (roles) used for this process. Signs requesting individuals remain in their car throughout the process identified the props drivers (and passengers) would use in this process/script. Clipboards or iPads (recognized prototypes for collecting data) and nasal swabs (recognized prototypes associated with medical process/medical testing) identified the props healthcare workers would use and (via prototype association) the uses of such items. Exit conditions included:

- signage indicating how to leave (drive out of) the testing area; and
- information healthcare workers provided that noted the person’s samples would be sent to a lab for testing (explaining exit conditions for information taken at site).

Such situations often included an explanation that individuals would later receive their test results via a specified method such as text message, email, or phone call (entry conditions for how information gets into another location and to the individual).

This process created a new script that allowed individuals to move easily into and through a new process in a location. This situation, moreover, was not truly new. Rather, it tapped existing scripts (alignment) for “drive through service” that prompted individuals to search for signs noting where to enter and exit drive-through areas. Such signs initiated a script-related behavior that identified the role of drivers (drive-through patron), so drivers knew to stay in their cars, roll down their window, and remain in the car when interacting with service providers in that setting.

Additionally, the process did not require individuals to re-arrange their daily lives to engage in a new activity. The drive-through testing process mirrored practices many individuals already engaged in when driving to or from work (e.g., getting coffee at the drive-through) or during lunch (e.g., ordering lunch at the drive-through). The drive-through testing process thus fit

readily into existing scripts that were part of most individuals’ regular routines. Finally, this new testing process mirrored existing design expectations to initiate an established script for starting, moving through, and completing a process. This mirroring involved signs (design) indicating entry and exit points for the process. Essentially, the design of these signs paralleled existing prototypes individuals used to identify and enter drive-through services (e.g., “Enter here for drive-through”) and exit them (e.g., “Drive-through exit”).

The result was a design thinking solution: A process based on observations of how humans act in contexts (i.e., engage with drive-through services) that led to a design solution (i.e., drive-through testing stations). Individuals could rapidly test and update this solution (e.g., revising the design of or moving the location of signs based on driver reactions) to create a process that addressed a need (rapid, effective testing facilities) and a related problem (a public health crisis). This design solution came via a new script based on cognitive models for existing practices in recognized contexts (i.e., how to act in drive-through lines). It did so through developing materials (signs) and activities (roles) participants recognized and knew how to use as they paralleled mental models (prototypes) individuals instantly recognized and used.

The rapid international adoption of drive-through COVID-19 testing facilities reveals how scripts and prototypes can lead to design solutions that solve problems and address needs. This situation also reveals how such approaches can be readily adapted for different audiences—as they have been for nations from South Korea to the U.S.—based on knowing and addressing an audience’s script and prototype expectations when designing products and solutions.

FINAL THOUGHTS

Design thinking pioneer Tim Brown (2008) notes one beauty of design thinking is almost anyone can use it. This is because design thinking focuses on observation, rapid prototyping, and iterative testing processes individuals can implement at a systems level. While simple to explain, enacting design thinking solutions involves understanding contextual dynamics that create problems or needs. Accordingly, the better one can observe and identify problems or needs in a context, the better one can implement design solutions. An

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understanding of cognitive factors affecting perceptions of contexts can facilitate these processes.

By applying cognitive concepts, individuals can enhance design thinking practices to better assess the dynamics affecting different contexts. The schemas of scripts and of prototypes can help with identifying context-related problems or needs and designing related solutions. These cognitive mechanisms can also help individuals understand the systems where contextual factors overlap and create designs that work at a greater system level. Through integrating scripts and prototypes into design thinking, individuals can create materials that better address the needs of workplaces, industries, and greater society.

REFERENCES

- Aitchison, J. (1994). Bad birds and better birds: Prototype theory. In V. P. Clark, P. A. Eschholz, & A. F. Rosa (Eds.), *Language: Introductory readings* (4th ed., pp. 445–459). St. Martins.
- Brown, T. (June 2008). Design thinking. *Harvard Business Review*, 84–92.
- Buchanan, R. (1992). Wicked problems in design thinking. *Design Issues*, 8(2), 5–21.
- Cave, K. R., Bush, W. S., & Taylor, T. G. G. (2010). Split attention as part of a flexible attentional system for complex scenes: Comment on Jans, Peters, and De Weerd. *Psychological Review*, 117(2), 685–695.
- Cook, M. P. (2006). Visual representations in science education: The influence of prior knowledge and cognitive load theory on instructional design principles. *Science Education*, 90(6), 1073–1019.
- Dym, C. L., Agogino, A. M., Eris, O., & Frey, D. D. (2005). Engineering design thinking, teaching, and learning. *Journal of Engineering Education*, 94(1), 103–120.
- Kirschner, P. A. (2002). Cognitive load theory: Implications on cognitive load theory on learning and design. *Learning and Instruction*, 12(1), 1–10.
- Kleiner, A. (2009). The thought leader interview: Tim Brown. *Strategy+Business*, 56, 1–8.
- Marois, R., & Ivanoff, J. (2005). Capacity limits of information processing in the brain. *Trends in Cognitive Sciences*, 9(6), 296–305.
- Mentzer, N. (2014). Team based engineering design thinking. *Journal of Technology Education*, 25(2), 52–72.
- Newman, P., Ferrarioy, M. A., Simm, W., Forshawz, S., Friday, A., & Whittle, J. (2015). The role of design thinking and physical prototyping in social software engineering. *Proceedings of the 2015 IEEE/ACM 37th IEEE International Conference on Software Engineering Vol. 2* (pp. 487–496). IEEE Computer Society.
- Norman, D. (2002). *The design of everyday things*. Basic Books.
- Owen, C. (2006). Design thinking: Notes on its nature and use. *Design Research Quarterly*, 1(2), 16–27.
- Pass, F., Renkl, A., & Sweller, J. (2003). Cognitive load theory and instructional design: Recent developments. *Educational Psychologist*, 38(1), 1–4.
- Pass, F., Renkl, A., & Sweller, J. (2004). Cognitive load theory: Instructional implications of the interaction between information structures and cognitive architecture. *Instructional Science*, 32(1), 1–8.
- Postle, B. R. (2016). How does the brain keep information “in mind”? *Current Directions Psychological Science*, 25(3), 151–156.
- Purdy, J. P. (2014). What can design thinking offer writing studies? *CCC*, 65(4), 612–641.
- Rosch, E. (1978). Principles of categorization. In E. Rosch & B. B. Lloyd (Eds.), *Cognition and Categorization* (pp. 27–48). Lawrence Erlbaum.
- Schank, R. C., & Abelson, R. P. (1977). *Scripts, plans, goals, and understanding*. Erlbaum.
- St.Amant, K. (2005). A prototype theory approach to international web site analysis and design. *Technical Communication Quarterly*, 14, 73–91.
- St.Amant, K. (2017). Of scripts and prototypes: A two-part approach to user experience design for international contexts. *Technical Communication*, 64(2), 113–125.
- St.Amant, K. (2021). Connecting crisis to community: COVID-19 and beyond. *Journal of Business and Technical Communication*, 35(1), 126–133.
- Schmidt, R. A. (1975). A schema theory of discrete motor skill learning. *Psychological Review*, 82(4), 225–260.
- Sweller, J. (1988). Cognitive load during problem solving: Effects on learning. *Cognitive Science*, 12, 257–285.

- Shalamova, N. (2016). Blending engineering content with design thinking and US to maximize student engagement in a technical communication class. *2016 IEEE International Professional Communication Conference (IPCC)*, (pp. 1–5). IEEE.
- Tomkins, S. S. (1978). *Script theory: Differential magnification of affects*. Nebraska Symposium on Motivation, 26, 201–236.
- Tomkins, S. S. (1987). Script theory. In J. Arnoff, A.I. Rabin, & R.A. Zucker (Eds.), *The emergence of personality* (pp. 147–216). Springer.
- Tse, D., Langston, R. F., Kakeyama, M., Bethus, I., Spooner, P. A., Wood, E. R., Witter, M. P., & Morris, R. G. M. (2007). Schemas and memory consolidation. *Science*, 316(76), 76–82.
- van Merriënboer, J. J. G., & Sweller, J. (2005). Cognitive load theory and complex learning: Recent developments and future directions. *Educational Psychology Review*, 17(2), 147–178.
- van Merriënboer, J. J. G., & Sweller, J. (2010). Cognitive load theory in health professional education: Design principles and strategies. *Medical Education*, 44(1), 85–93.
- Wickman, C. (2014). Wicked problems in technical communication. *Journal of Technical Writing and Communication*, 44(1), 23–42.
- Wu, T., Dufford, A. J., Mackie, M. A., Egan, L. J., & Fan, J. (2016). The capacity of cognitive control estimated from a perceptual decision-making task. *Scientific Reports*, 6(34025), 1–11.
- Yamada, R., & Itsukushima, Y. (2013). The effects of schema on recognition memories and subjective experiences for actions and objects. *Japanese Psychological Research*, 55(4), 366–377.
- Your brain is like a computer. (2017). *Ohio Valley Center for Brain Injury Prevention and Rehabilitation*.

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Signaling Context in Topic-Based Writing

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By Jason Swarts

ABSTRACT

In topic-based writing delivered as web help or interactive PDF, readers are able to access topics non-linearly, reading only those topics they feel a need to read. Consequently, readers can easily lose a sense of a topic's broader context of related topics and concepts, which is knowledge presumed of a "qualified reader."

Purpose: This paper investigates how relative "that" and "which" clauses are used to signal context in writing that is intended to be free of obligatory contextual connections to other topics in a documentation set.

Method: This analysis relies on a computer-assisted, descriptive analysis of relative pronoun use in a corpus of published, topic-based documentation. The analysis focuses on "that" and "which," typically used in English to refer to and add information (e.g., a context) about an antecedent noun.

Results: Relative "that" and "which" clauses are shown to be used in a variety of ways in topic-based writing to signal associations between topics, making it easier for readers who need context to find it.

Conclusions: The author offers implications for writing practice that include deliberate, strategic use of "that" and "which" and complementary documentation design that enables readers to locate contextual information signaled by those pronouns.

KEYWORDS: topics, context, documentation, user experience, navigation

Practitioner's Takeaway

- Writers should choose, deliberately, when to use "that" clauses in their documentation. Use "that" to signal important contextual information because readers may be attuned to expect important information to follow use of "that."
- Writers should follow the use of "that" and "which" with concrete, task-oriented words that are distinct enough to be found in the titles and headings of other topics.
- Students should be taught to pay attention to "that" and "which" as syntactic cues that may assist readers by signaling context. This signaling function may be one, among others, that writers should be trained to recognize.
- The use of "that" as a contextual signal may indicate the need for usability research on interpretive and navigational ambiguities that are part of the user experience of topic-based writing online. How vital are syntactic cues at shaping user experience?

INTRODUCTION

In the professional technical communication context of structured authoring, content is challenging to create because its topics are not necessarily coherent or unified in the way they are in static documentation. Topics are:

Freed from the confines of static documents
 . . . [and] conform to rules defined by standards
 and schemas, which ensure that the topics are
 consistently structured and can be assembled into
 different information products that are rendered
 in different outputs for different delivery channels.
 (Andersen, 2013, p. 116)

Conventional strategies for creating coherence frustrate the style of writing Andersen describes. For one, making text stick together in large sections (e.g., chapters) can resist recombination into new outputs. The writing Andersen describes is topic-based, and it has been around for decades, perhaps most visibly following the increased adoption of component content management systems (Batova, 2014) and information models like the Darwin Information Typing Architecture (DITA), which made it possible to create content for multiple document outputs (Priestley, Hargis, & Carpenter, 2001; Rockley, 2001).

Topic-based writing, especially that which is intended for delivery as web help or interactive PDF, requires content that is modular, highly specific and “bite-sized” (Andersen, 2013, p. 126). These topics must be “highly adaptable and portable” and “not limited to one purpose, technology or output” (2013, p. 131). Topics that are both highly portable and capable of supporting multiple uses must not be bound to any one, larger context of interpretation that runs across multiple topics. Instead, topics should be understandable outside of any particular context while still providing readers guidance toward a broader context into which the content potentially fits (Baker, 2013, p. 113).

Technical communicators have been doing topic-based writing for at least 20 years. It is nearly 30 years if we trace the origins to John Carroll (1990) and minimalism as Carlos Evia (2019) does. It is 50 years if we trace to work that Robert Horn and his colleagues were doing on information mapping and block-style information development (Horn, Nicol, Kleinman, & Grace, 1969). Regardless, writers have

had lots of practice, and this experience suggests that writers will have developed practices for building contextual coherence without fixing a topic to any particular context of meaning. Yet, much of the advice that appears about topic-based writing focuses on what topics avoid doing rather than on what they do. Topics:

- have no interpretive obligation to other content (Baker, 2013, p. 76; Rockley, Manning, & Cooper, 2009, p. 24); and
- are devoid of referential material and relational language (Bellamy, Carey, & Schlotfeldt, 2012, p. 196).

Topics are more complicated than this. If Eble (2003) is correct, topics do still need to signal a range of contexts into which they potentially fit and become coherent.

The purpose of this research is to examine topic-based writing, delivered as web help or interactive PDF, to identify how those topics build a coherent sense of the whole by using the relative pronouns “that” and “which” to signal contexts to which topics potentially connect. My approach is to work through a computer-assisted, corpus analysis of topic-based writing. Analyzing a corpus of topics allows us to get around a problem of scale. We can analyze broad language patterns in a corpus that then guide a more traditional, close analysis of texts selected as representative of the broader language pattern. In this case, analysis will focus on a language marker associated with context formation: the relative pronouns “that” and “which” (Fabb, 1990). There are other ways to approach the same analysis of context signaling, however. For example, words that refer (*this, that, the, a, an*) or words that join or link ideas (*and, so, consequently, or*) direct reader attention to related content (see Halliday & Matthiessen, 2004, pp. 536–537). My more limited approach should only be taken as an indication of one syntactic choice that writers should be aware of.

Leading up to the corpus analysis, I review the literature on topic-based writing to better articulate what topics should do to signal context. Particularly, I focus on the assumption of the “qualified reader” (Baker, 2013, pp. 156–157), an audience type that writers should plan for and support. I then review literature on “that” and “which,” used as relative pronouns, to support using them as an indicator of context signaling in and across topics. Qualified readers, I argue, become qualified when writers signal a context and signpost where the contextual information can

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be found. I then walk through a corpus analysis of topic-based writing, illustrate the findings with some examples, and finally address some implications for practice, teaching, and research.

Topic-Based Writing

Authors who write about topics are consistent in their descriptions of them. According to Rockley, Manning, and Cooper (2009), who identify one common set of characteristics, a topic (in part):

- Is “designed to stand on [its] own with cross-references to other topics” (p. 4)
- Is “a discrete piece of content that is about a specific subject, has an identifiable purpose, and can stand alone” (p. 24)
- “Answers a single question” (p. 46)
- “Consist[s] of only one subject” (p. 46)
- Must “be read without the need to read any preceding or following information to understand it” (p. 47)
- Is “not specific to any one usage” (p. 47)

Topics do this work because they have “wording that is independent of any other input” (Evia, 2019, p. 53). They are self-contained and complete with their own purpose statements and context (Baker, 2013, p. 86). Their language makes no “assumptions about where [readers] have come from and enforces no prescription about where they should go next” (Baker, 2011, para. 24).

Outside of including “see also” links, topics should avoid making reference to other topics or to a single context that the reader must understand to use the topic they have accessed (Bellamy et al., 2012, p. 196). And if topic-based writing derives from John Carroll’s work on minimalism, it should also rely less on “control” language that we put in topics to order and sequence information in the manner we want readers to receive it (Carroll, 1990, p. 9; Ament, 2003, p. 5), with the intent to “reduce the interference in a user understanding content” (Gillespie, 2017, p. 2).

We also have contradictory explanations about topic independence. Baker (2013) notes a simultaneous need for topics to be both self-contained (i.e., meaning is not dependent on context) but also contextual by putting a topic into a broader context (pp. 118, 155; see also Eble, 2003). As Evia notes, “trying to define the concept of topic in rhetoric is not that easy” (2019, p. 53), but doing so is important to the adoption of topic-based writing (Andersen & Batova, 2015; Flanagan, 2015).

Baker (2013) describes the audience for topics as the “qualified reader,” which he defines as “a reader who knows everything needed to perform the specific and limited purpose of the topic except the specifics of the case that the topic covers” (2013, p. 127). For example, a topic about using collections in a citation manager may not talk about how one adds items to a citation library, but the topic likely assumes that readers either already know how to add items or can recognize that they should learn. However, we cannot assume that readers come to our topics as fully qualified readers. One additional purpose of topic-based writing is to support development of qualified readers, as needed. “Readers who are not fully qualified can read other topics to get the information they need” (Baker, 2013, p. 78), except that they need to know what other topics to read. That is, they need awareness of the context that they are assumed to know.

To be clearer, consider the challenge of moving content from a static book-based writing style to a topic-based one. Following the stylistic guidelines described in the bullet list above would not lead to very successful topics. “Simply chunking your chapter or narrative-based content into separate topics is not an effective way to make the transition to topic-based authoring. Think about how much connective meaning occurs when you write a more narratively structured chapter” (Samuels, 2013, para 6). The reason, as Samuels points out, is that writers rely on a great deal of “connective” meanings to build a sense of a coherent whole: how one topic fits with others. Qualified readers are those who either know the topical context ahead of time or can inform themselves by reading the topics needed to round out that sense of context. The implication is that topics that effectively address qualified readers have some element of connective language that signals the broader contexts into which a topic fits (Eble, 2003, p. 345, also Rockley, 2001, p. 192). The writer’s goal is to maximize rather than to minimize the potential for combining topics with other topics, all while not letting topic contexts collide or restrict one another by creating topic dependencies that curtail topic reuse.

Others writing about topics agree that some broader coherence is required for readers to use topic-based content effectively. Kantner, Shroyer, and Rosenbaum (2002) say that effectively written content must support readers becoming oriented to the content and how that

content relates to other content (p. 340). And Wachter-Boettcher (2012) argues that chunks of content still need to signal their relationship to the whole (p. 47). But creating this coherence without locking readers in to one way of reading the content across topics is the challenge.

Regarding coherence, Williams (1997) writes that the problem is that coherence is not “directly ‘in’ what you write. Like all other characteristics of prose, it is created by your readers out of what you put before them” (p. 101). What do writers put before their readers that kindles the coherence that supports qualified readers? It must be subtle but strong enough that readers “will infer logical connections that you do not state” (p. 101). Readers “will impose a shape on parts that you do not explicitly relate” (p. 101). But to do this, “readers need some cues, some signals of the coherence in your own mind” (p. 101).

Language for Creating Coherence

When studying language, we can pay attention to words that carry the content, and through that approach derive an understanding of what a text is about (Scott, 1997). Another approach is to examine words that do not carry explicit meaning but instead link other words and concepts together. These words perform a function, such as pointing, relating, connecting. Function words are those “that connect, shape, and organize content words” (Pennebaker, 2011, p. 22). This function language is subtle enough that readers may not notice, but it shapes how we read and pay attention. Furthermore, function words are a good point of focus because it is through them that we can see subtle choices writers make to optimize comprehension (e.g., Kohl, 1999, p. 149) and build coherence.

Coherence provides a sense of focus (Williams, 1997, p. 106). When looking for coherence, readers will look for ways that fragments of information can be connected (Brown & Yule, 1983, p. 224). We achieve coherence by relying on recognizable genre forms or other conventional structures, like conversational turns, that help readers see how fragments of conversation and text are connected (see Stubbs, 1996, Chapter 8; Geisler & Swarts, 2019, Chapter 3). Readers also rely on explicit cognitive markers (e.g., words like “because” and “therefore”), which help them process text and intuit relationships between the content one is reading and the content one has yet to read. Such words create

a framework for readers to “integrate new information with information already stated previously” (Sanders, Land, & Mulder, 2007, p. 220). But these markers can also be confining when specifying too exact a connection.

Writers also signal coherence through the use of structural features like headings, previews, and logical connectors (see, for example, Spyridakis, 1989; Horn et al., 1969), particularly in long and complex documents. When these markers are in place, readers are less confused and better able to recall content (Sanders & Noordman, 2000). The stronger the stated relationship between pieces of content, the better the recall and relationship building (p. 52).

Yet for these strategies to build coherence, they need to be visible to the readers but not so visible that they become obstructive uses of control language that detract from the value of having highly flexible and modular content. An example comes from the Motorola documentation for the mg7550 router:

To Change the Network Name and Password

For the 5 GHz band:

1. Select and delete the old Network Name, then type in the new Network Name.
2. Click the Save button.
3. You can click the Show Key box to check your typing for Password.
4. Select and delete the old Password, then type in the new Password.
5. Click the Save button.

For the 2.4 GHz band:

6. Select and delete the old Network Name, then type in the new Network Name.
7. Click the Save button.
8. You can click the Show Key box to check your typing for Password.
9. Select and delete the old Password, then type in the new Password.
10. Click the Save button (Motorola, 2020, p. 33).

The documentation references the context of changing wireless settings, and the continuous numbering across steps for the 5 GHz band and 2.4 GHz band indicates that these steps are part of a single task. The assumption, apparent in the title of the section, is that the reader’s intent is to rename both bands and change their password. However, if one is accessing the content (via search) to determine how to manipulate

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the bands by splitting and renaming them, as some internet-capable appliances (e.g., outlets, water heaters) require, the steps make too many assumptions that are not appropriate to the task. Furthermore, instructing the reader to “type in the new Password” suggests that the bands remain combined, accessible by a single password.

Function words might also serve a purpose that structural coherence markers cannot. Depending on the kind of function words used, they might achieve both subtlety in visual presence but also emphasis in terms of their perceived importance for understanding what is written. In English, much has been written, particularly, about the use of “which” and “that” as relative pronouns that introduce restrictive and non-restrictive modifying clauses. Traditionally, “that” has been thought of as a “restrictive” (essential) modifier that defines, and “which” has been thought of as a “non-restrictive” (non-essential) modifier that does not necessarily define (Fowler & Crystal, 2009). However, this common-sense (to many) look at language use is defied by the examination of language in use, which shows both “that” and “which” used in restrictive and non-restrictive contexts (Bache & Jakobsen, 1980, p. 253). They both signal the addition of information for the nouns being modified.

A more reliable way of differentiating between restrictive and non-restrictive uses of “that” and “which” concerns their “presentation” effect. According to Bache and Jakobsen (1980), the use of a restrictive modifier is called for in situations where the receiver of the spoken or written sentence is thought to need some assistance in understanding what the addresser is talking about, versus adding supplemental information to what the receiver already likely understands. Authors might choose “that” in situations where they anticipate ambiguity or anticipate that readers will experience a lack of information (Temperley, 2003, p. 467):

A: “You need to press the button that is flashing.”

B: “You need to press the button, which is on your left.”

In both examples, “that” and “which” introduce more information and context for understanding. It is the button that is flashing (A). It is the button on your left (B). The difference is that A uses “that” to signal an essential modifier. Presumably, the information

following “that” cannot be omitted from the sentence without altering its meaning. In B, “which” introduces a non-essential modifier, which presumably can be removed; although, arguably, the clause does disambiguate which button (i.e., not the one on the right).

“That” and “which” work as pronouns whose function is to replace, but also to connect, antecedent nouns to clauses that modify them, thereby adding information that may signal a context or contexts to which the antecedent noun is connected. “That” implies that the added information is essential and defining. “That,” plus its modifying clause, adds information about a noun to distinguish it in some way from similar nouns. This function has been called “co-indexing” (Fabb, 1990, p. 58) in that it both points to the antecedent as a necessary relationship and points to a thing in the world that the restrictive modifier must also index (p. 76). “Which” may achieve the same effect, the only difference being a conditional expectation that “which” traditionally introduces non-essential information.

Hinrichs, Szmrecsanyi, and Bohmann (2015) complicate the picture of “that” and “which” by showing, via corpus analysis, how the use of “that” has increased over time, relative to the use of “which,” and that the increase is not attributable only to the increasing complexity of writing or to the intrusive influence of automated grammar checkers. Instead, their analysis of the increase in “that” attributes influence to norms of writing imposed by editors and editorial guides, like style guides (Hinrichs, Szmrecsanyi, and Bohmann, 2015, pp. 825, 828). For example: “Use ‘that,’ without a comma, to introduce a restrictive clause. Use ‘which,’ preceded by a comma, to introduce a nonrestrictive clause” (IBM, 2014). Similarly, style guides recommend using “that” and “which” to clarify content that will be translated from English to other languages (see Akis et al., 2003; Clark, 2009; Kohl, 1999). Although the association of “that” with restrictive clauses and “which” with non-restrictive clauses may not be so categorical in natural language, editorially-shaped writing like technical documentation likely shows a tendency in this direction.

Given that topic-based writing is modular in its development and presentation and that it relies on strategies of minimalism, we might expect “that” and “which” to play a significant role in signaling context

in topic-based writing. Further, given some editorial preference for “that” (compared to “which”) for signaling a stronger relationship to context, we might also expect to find “that” being used more often and differently than “which” for building coherence. This expectation forms the basis of the research question pursued in this paper: How does topic-based writing, delivered as web help or interactive PDF, use relative “that” and “which” clauses for context signaling? This question requires examination of a large body of topic-based writing.

METHODS

Questions about writing style require a large enough body of data to see large-scale language patterns. Corpus analysis utilizes computational support from corpus linguistic software to search for language phenomena across a large corpus and to test the degree to which a language phenomenon is present in and distributed throughout that corpus. Language phenomena that are both present and well-distributed in a corpus of similar texts are arguably part of that writing style. The software then allows one to quantitatively describe the degree to which the language phenomena are present and distributed (see Brezina, 2018).

Data Collection

The question driving this study required the creation of a corpus of documentation written using methodologies of topic-based authoring. To build up this corpus, I solicited input from technical communicators who work at organizations where documentation is produced as topics.

To collect samples of documentation for the topic-based writing corpus, I reached out to practicing technical communicators through chapters of the Society for Technical Communication (21 chapters) and to directors of academic programs in technical communication (18 directors) who could pass the survey request to alumni working in the profession. I cannot know the total number of people who ultimately received the survey invitation.

Of those who received the request, I asked which of the following described the approach that they take to writing at their places of work:

- “I produce ‘topic-based writing’ which consists of standalone topics (i.e., content chunks) that can be reused in different contexts.”
- “I produce ‘book-oriented writing’ (or document-oriented writing) which consists of content designed for a singular use and context of delivery (e.g., a user manual).”

Of 35 responses, 49% (17) responded that they produce “topic-based writing” (TBW), 34% (12) said they produce “book-based writing” (BBW), and 17% (6) replied that they produce both kinds. The respondents represent a range of professional sectors:

- IT (including software/hardware design and testing): 20
- Business and Financial Services: 4
- Education and Training: 2
- Community and Social Services: 2
- Medical and Healthcare: 1
- Legal: 1
- Architecture and Engineering: 1
- Other: 12

The survey allowed participants to select more than one option.

As I requested, all respondents directed me to at least one published example of documentation that they produce. All of the samples of documentation were publicly available on company websites. Although the resulting corpus essentially reflects a convenience sample of documentation, and although I cannot account for differences in the respondents’ experience as writers, all of the samples included in the corpus represent topic-based writing that were of a quality high enough to pass editorial review at their companies. Furthermore, because topic-based documentation is often written in teams, the relative experience or lack of experience for any one respondent is unlikely to skew the analysis of language features.

All samples of documentation were downloaded and arranged into a folder holding the corpus. To reduce the chance of a text sampling bias (see Brezina, 2018, p. 16), I selected into the TBW corpus whole documentation sets (i.e., all topics included in an outputted set of documentation) into both corpora. In this way, analysis of the corpus is equally likely to draw from the beginning, middle, or end of a documentation set and equally likely to be drawn from topics/sections concerning different kinds of user interactions (e.g., installation, account setup, etc.).

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One hundred and twenty-three full documentation sets are included in the corpus. Although the documentation sets come from 15 different companies, it is possible that some of the topics overlap, meaning that some exact phrasing choices may be duplicated in the full corpus. I did not attempt to control for that possibility, so it may be considered a limitation of the corpus. The resulting TBW corpus consists of 1,342 files; 6,519,854 tokens; and 134,121 distinct word types.

Data Processing and Analysis

The files were analyzed using the free corpus analysis software, Lancsbox, distributed by Lancaster University (Brezina, Weill-Tessier, & McEnery, 2020). Lancsbox supports most basic visual and statistical analyses of corpora. I utilized the part-of-speech (POS) tagging in Lancsbox, which marked all tokens in the corpus files with a part of speech tag using the Penn Treebank POS markers.

Lancsbox supports comparative searching based on POS tag. The result of that search yielded a list of determiners, including “that” and “which.” The majority of “that” and “which” instances were tagged as “WDT”: wh-determiners. However, subsequent analysis shows that most of these WDT uses of the “that” and “which” are as relative pronouns, which is what the analysis in this paper focuses on. By default, in Lancsbox, the list of positive search results also showed a context. I set the context parameters to show 30 words to the left and right of “that” and “which,” which is enough to establish the immediate context for the word.

The main research question asks how relative “that” and “which” clauses are used in the TBW corpus. Beyond the quantitative measures of rate of use and dispersion, the question asks whether the “that” and “which” clauses are used differently in the TBW corpus.

To facilitate the qualitative analysis, I drew a random 5% sample of all relative “that” and “which” clauses in the TBW corpus. After isolating relative “that” and “which” clauses, I highlighted the head noun (i.e., that noun being modified) as well as the modifying clause. For each, I applied one of the following codes:

- **Topic:** code a modifying clause as “topic” if it clarifies, specifies, or renames the head noun, often by reference to content immediately preceding the modified noun or noun phrase.

- **Context:** code a modifying clause as “context” if it adds information to the head noun by connecting it with new topics. The modifier points readers to additional actors (e.g., functions, systems, hardware) or actions (e.g., validate, verify) that are not described or derived from content to the left of the head noun.

These codes arose out of consideration of the kind of information that might be added to a topic, and so I focused on the work of “that” and “which,” used as relative pronouns. “Topic” information would be confined to the topic at hand and would leave the topic cohesive without pointing readers elsewhere in the documentation set. “Context” information would acknowledge that there are additional topics that a qualified reader should either know or reference. The codes were verified with a second coder, resulting in 88.6% simple reliability, corrected with Cohen’s Kappa to 0.77, indicating substantial agreement (Landis & Koch, 1977).

RESULTS

Quantitative analysis of the corpus shows that writers of topics use “that” more frequently than “which.” Writers used “that” 25,788 times (0.4% of the corpus) and “which” only 9,439 (0.1% of the corpus). The use of both was somewhat dispersed throughout the corpus with “that” appearing in 993 of 1342 files (73.9%) and “which” appearing in 791 of 1342 files (58.9%). These frequencies and dispersions are difficult to explain without additional research, but they appear to show that writers were choosing essential modification more commonly than non-essential modification. The framework pursued in this study sought to understand a potential role that “that” might play in providing a sense of rhetorical context that could help readers of topics become “qualified readers” (Baker, 2013). The coding of modifying clauses following “that” and “which” reveal some patterns of difference.

The results of coding a random sample of 300 relative “that” and 300 “which” clauses from the TBW corpus show that when topic-based writers used “that,” the information following was slightly more likely to be “context” information (157 instances, 52.3%) than “topic” information (143 instances, 47.7%). When the writers used “which,” the difference was more pronounced, and in the other direction, with “context”

information being referenced 106 times (35.3%) and topic information being referenced 194 times (64.7%). The finding suggests that uses of “which” are more strongly associated with additional information that is found within the topic whereas uses of “that” are more likely to point to information that is not within the topic. These “context” references pointed to actors and functions found elsewhere in the documentation. Overall, the qualitative coding of modifying clauses associated with “that” suggests that writers of topic-based documentation are using the modifying clauses to introduce or reference contextual and topic information that is germane to the noun being modified.

DISCUSSION

The coding of “that” and “which” suggests that the information writers deemed to be important, but potentially unknown, to readers is contextual in scope slightly more often than it is topical in scope. When writers conventionally signal a nonessential modifier using “which,” the additional information is more likely to be in the topic. This finding suggests that writers may use “that” for building coherence across topics, by pointing to content that is outside of, but important context for, the topic. The discussion that follows will focus on elaborating some examples of both kinds of modification to show what kinds of context are revealed and how.

Topic-Referring Modifiers

The first function for relative “that” and “which” clauses can be described as “topic-referring” modification. These are modifying references that complete topics by referring readers to content that has already been discussed within the topic.

On one hand are modifying clauses that merely add what appears to be non-essential information to the topic. These are clauses that are commonly, but not exclusively, introduced by “which”:

- “Deny: Specify the hosts or networks for **which access is denied**” (Hitachi, 2019b).
- “All other marks not owned by us **that appear herein**” (Vernier, 2019).
- “The IP address of the client application **that made the request**” (NetApp, 2019b).
- “... savings to filter out opportunities that have less than that amount of savings. Select one or more

departments **by which to filter opportunities**” (Strata Decision Technology, 2019).

In the above examples, and in others like them, the modifying clauses add small amounts of information to the head nouns or noun phrases that are modified. In some cases, the modifying information is inferable from the content that immediately preceded it. For example, “to filter our opportunities that have less than that amount of savings” directly follows the heading “Identified Savings Threshold,” which establishes that the section is about savings thresholds. Other examples add distinctly nonessential information, such as indicating that a dialogue box will appear.

The expectation, apparently, is that what readers need to know about the noun being modified is already known. The modifying information appears to offer minimal improvement to coherence across topics, perhaps in some cases just to differentiate similar pieces of information that might be visible on the screen. An example is a tip that “You can filter the list of connections by displaying only connections that are selected (Checked) or by the status of the connection” (Tanium, 2019a, p. 33).

The more interesting topic-referring modifiers are those that include references to other actors, functions, subsystems, settings, peripherals, and the like that are important for understanding the topics where they appear and are explained within the same topic. Often, these references point to content that is adjacent to the modifying clause. Examples include:

- “Click the DR [disaster recovery] plan associated with the virtual machine. The DR plan details page opens. 6. In the VMs tab, select the virtual machine(s) for **which you want to enable the disaster recovery service**” (Druva, 2019c).
- “... for File Services Manager to monitor quotas. The initial setting is no quota monitoring. If you omit this option, the current setting information applies monitoring-time [, monitoring-time...] Specify the times at **which File Services Manager monitors quotas**” (Hitachi, 2019c).
- “Create a Profile **which has only Cloud Apps enabled and settings configured in it**” (Druva, 2019a).
- “[Product] certifies backup and restore of databases **that are created and managed using SQL Server 2017**” (Druva, 2019b).

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The modifying clauses in these examples create coherence by creating connections between user actions, system actions, as well as other actors and functions that are already mentioned in the topic. In the example above, from Hitachi, the clause “which File Services Manager monitors quotas” connects the times to the actor “File Services Manager” and to the function “monitors,” both of which were pieces of information established earlier in the same topic. The information a qualified reader needs is within the limited contextual scope of the topic. As self-contained topics, these can be more readily re-used in other output formats.

Here is another example to illustrate:

“Fields

Shows a table of the fields used in the report.
Drilldown reports (field level) Shows a table of the reports in the solution set **that are associated with the fields in the report**” (Hitachi, 2019a).

“That” is being used to introduce a clause that adds information about the “table of reports,” specifying that they are the ones that “are associated with the fields in the report.” The “report” mentioned in this modifying clause is the subject of the section where this information appears. Even readers who have accessed this topic without reading through related topics will have enough background knowledge from reading the topic to know which report is being referenced.

The type of topic-referring clauses discussed above account for the majority of topic modifying clauses found in the sample drawn from the TBW corpus. In two-thirds of samples analyzed, the topic-referring clauses were preceded by the use of “which.” In topic-referring modifying clauses, readers are not pointed very far away from the head noun or noun phrase to find the information that the author considered important for understanding the topic at hand.

Context-Referring Modifiers

A second function for relative “that” and “which” clauses are “context-referring.” These are uses that modify content in a topic with references to actors, actions, functions, settings, peripherals, and the like that are not present in the topic being read but are instead located elsewhere in the documentation and make up the broader context that makes a given topic coherent. The modifiers are presented as if the content

is both 1) not assumed to be well enough known to go unsaid (Bache & Jacobssen, 1980), and 2) essential to understanding the broader set of topics that the current topic connects with. Some examples:

- “When you upgrade a Citrix Virtual Apps and Desktops deployment:
 - If you upgrade from a version **that did not support CEIP**, you are asked if you want to participate” (Citrix, 2019, p. 1030).
- “Endpoint Count Select the maximum number of endpoints expected, including endpoints **that connect to the Zone Server(s)**” (Tanium, 2019b, p. 8).
- “If you make schema changes to the APIs **that were created ground up by you in TIBCO Business Studio for BusinessWorks**, the Swagger for such APIs automatically gets updated by the TIBCO Business Studio for BusinessWorks” (TIBCO, 2019, p. 37).

These examples show sometimes complex references to user actions, system actions, as well as actors and functions associated with and discussed in other topics but that are connected to the head noun or noun phrase being modified. For example, the last item in the list above draws the reader’s attention to APIs that may have previously been created by the TIBCO Business Studio and asks the readers to consider if those APIs have been changed. Qualified readers (some at least) will be required to know something about those APIs. Similarly, the first two bulleted examples also specify actors that either clarify the Citrix Virtual Apps and Desktop version to be upgraded (item #1) or required by any Zone Server or Servers (item #2). Each of these references (i.e., CEIP, Zone Servers, APIs) are topics in their own rights. Often, the content referenced was in entirely different topic files, requiring readers to navigate to that content if they need it, to make themselves the qualified readers the writing presumed them to be.

A qualified reader or one who is seeking to become qualified, as presupposed by the following passage, can recognize the implicit reference to additional information and store it away or pursue it:

“You must configure a number of settings before the Archive Node can communicate with an external archival storage system **that connects to the StorageGRID system through the S3 API**” (NetApp, 2019a).

The “that” clause modifies “external archival storage system,” identifying it as the one that “connects to the StorageGRID system through the S3 API.” The essential modifier indicates that readers might find additional information about connections with the StorageGRID and connections via S3 API.

Key ideas following “that” are important clues about navigation and linking topics. The clues point out of the current topic to other topics, and readers who need additional clarification about the Archive Node can find StorageGRID system, S3 API, but also, importantly, the term “connect,” which is in the topic title “Configuring connection settings for S3 API.” Another example:

“To enable user mapping using LDAP, create a schema file **that defines attributes and object classes recognized by the LDAP server configured by using OpenLDAP**” (Hitachi, 2019e, p. 3).

The modifying clause does the same thing as in previous examples. It is pointing to additional information, such as “attributes and object classes” and to the “LDAP server” and “OpenLDAP” by implied/reduced relative modification (i.e., [that are] recognized by the LDAP server [that is] configured using OpenLDAP). These “attributes and object classes” represent a direct reference to a different topic. The “LDAP server” points not just to different topics, but to different product documentation entirely (i.e., OpenLDAP) and then to the topic of object classes and attributes recognized by the system. Although this example includes reduced “that” clauses (e.g., “by the LDAP server [that is] configured by ...”), such reductions are more common in informal writing (Carter & McCarthy, 2006, p. 387). In formal technical communication, including “that” is recommended (see Kohl, 1999, p. 151):

“sourceKey: Specifies the Listener source secret key **that identifies the Listener source feed to which SAS Event Stream Processing sends data**” (SAS, 2019, p. 171).

This example shows a “that” clause which modifies a noun or actor in a topic and connects that topic with others to round out the fuller context to create coherence among topics. In this case, the topic is “sourceKey” that identifies a “Listener source feed,” which is another topic that readers are presumed to understand already. Qualified readers might come to

this topic knowing what the “Listener source feed” is and only need specification about what role the “sourceKey” plays in the process. Or they know they will have to consult a topic on “Listener source feeds” to gain the knowledge they are presumed to have.

Unlike the previous examples, the information following this modifier is not helpful at guiding readers to the fuller context because they are directed to look for a “Listener source feed,” which is not specifically referenced in the navigation. Perhaps, though, it may be locatable through search or an index. Such words could support readers with what Pirolli and Card (1999) called “information foraging,” searching for information or, failing at that, searching for the “information scent” or signs that are distinct and clear enough to lead readers to find the information they need.

When people read topic-based writing, they can seek out context non-linearly and as needed. For this reason, navigational assistance is important for readers, to help them find the additional topics that contribute to a broad contextual coherence. I will return to this point about navigation in the implications that follow in the conclusion.

To illustrate this point about how relative “that” clauses signal important context, consider the words immediately following, within two words of the relative pronoun. Lancsbox supports investigation of the network of words around “that” via use of graph collocation (i.e., a graph of words that are co-located with the words of interest). To generate these graph collocation networks showing the most common words clustering around “that,” I first filtered the list of clauses containing the word “that” by excluding “that” references with the part of speech tag “DT” (determiner) as well as with the part of speech tag “IN/that” (that as subordinator) leaving only uses of “that” with the WDT (wh-determiner) part of speech tag which are those uses of “that” analyzed throughout this paper (see Penn Treebank <https://www.sketchengine.eu/penn-treebank-tagset/>). I then specified a word span that looked two words to the right of each use of “that.” To filter out most of the words that might appear only a few times, I set a threshold value of at least 50 collocations. To choose which collocated words to include in the graph collocation below (Figure 1), I used LogRatio to determine how much more likely a word would be to connect with “that” compared to other words in the corpus. LogRatio shows collocations

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that are more prevalent than chance (see Hardie, 2014). To simplify the display of data, I set the LogRatio value to 5.0 or higher (i.e., more than 32 times more likely to occur than chance). Figure 1 shows a collocation graph for “that” in the TBW corpus.

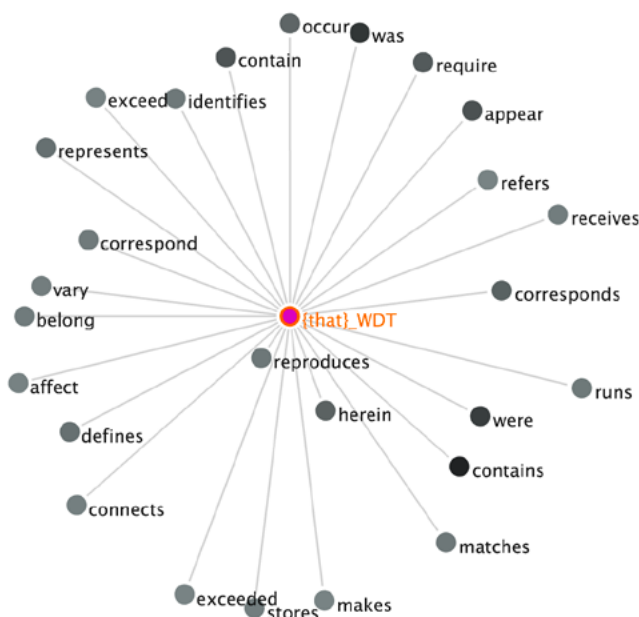


Figure 1. Common Words Appearing Within Two Words to the Right of “that” in TBW.

We see strong collocations with verbs indicating generic actions (e.g., contains, makes, appear). However, we also see active verbs that users can carry out, words that readers may recognize as describing their intended actions or as concrete system actions and then look for those topics in the navigation. Verbs such as “correspond(s),” “defines,” “matches,” “stores,” and “runs” point to task-oriented information that one might readily use to organize a set of topics. These words represent the context to which unqualified readers might be directed. The more concrete that information is, the easier it may be for readers to get to those topics. From these examples of documentation, we can see some implications for writers of topic-based documentation.

CONCLUSION

Although this analysis focuses on the contribution of “that” and “which” to a topic-based writing style, these relative pronouns are not likely to be the only language

choices that contribute to our understanding of how writers of topics help their readers become qualified readers. An analysis with this focus is, however, intended as a step toward that broader awareness of how language choices may help readers utilize topic-based documentation. The findings reported in this paper suggest that there may be rhetorical decisions that writers should be aware of and consider more deliberately when attempting to signal important pieces of context for their readers.

The first rhetorical decision is to choose more deliberately what kinds of pronominal references to use in documentation. For users of topic-based documentation, who may access topics non-linearly, via search, writers should recognize that relative “that” and “which” clauses are perhaps helpfully used as context signals, directing reader attention across and into other topics without being obtrusive about the references in a way that would limit the reusability of the topic content.

The second rhetorical decision is related to the first. Writers should pay attention to the content following uses of “that” and “which.” Nouns that signal important context can also support navigation. When readers recognize their lagging qualifications for understanding presumed context, they may seek out signals about what that context might be and look for navigational aids to find related content. Likewise, choosing vivid action verbs that point to distinct, searchable user and system actions might also aid in navigating to topics in the broader context. We may be advised, given the data here, to attend more deliberately to our word choice in modifying “that” and “which” clauses.

The third rhetorical decision builds on the previous two and suggests that in TBW, where every topic must stand alone, writers need to see an obligation to their readers to help them envision the larger context. Subtle signals about related concepts and tasks might be helpful, but readers would likely benefit from more guidance to pick up on the information scent. Writers might be well advised to choose words that are not only concrete but also specifically reflected in the navigation structures and metadata, allowing readers to navigate their way through topic-based documentation.

The potential importance of topic and navigation labeling, as a complement to context signaling, suggests that usability research may be in order. We do not know much about the user experience of topic-based

writing, but the potential exists for readers to see topics as more isolated and acontextual than they are. Signals, such as those introduced by the relative pronouns “that” and “which,” when used deliberately, may have a cumulatively positive effect on how readers understand what is expected of them and where to find information that they might need.

REFERENCES

- Akis, J. W., Brucker, S., Chapman, V., Ethington, L., Kuhns, B., & Schemenaur, P. (2003). Authoring translation-ready documents: Is software the answer? *Proceedings of the 21st Annual International Conference on Documentation*, 39–44. <https://doi.org/10.1145/944868.944878>
- Ament, K. (2002). *Single sourcing: Building modular documentation*. William Andrew.
- Andersen, R. (2013). Rhetorical work in the age of content management: Implications for the field of technical communication. *Journal of Business and Technical Communication*, 28(2), 115–157. 1050651913513904
- Andersen, R., & Batova, T. (2015). The current state of component content management: An integrative literature review. *IEEE Transactions on Professional Communication*, 58(3), 247–270.
- Bache, C., & Jakobsen, L. K. (1980). On the distinction between restrictive and non-restrictive relative clauses in modern English. *Lingua*, 52(3), 243–267. [https://doi.org/10.1016/0024-3841\(80\)90036-4](https://doi.org/10.1016/0024-3841(80)90036-4)
- Baker, M. (2011, June 9). What is a topic? What does standalone mean? *Every Page Is Page One*. <https://everypageispageone.com/2011/06/08/what-is-a-topic-what-does-standalone-mean/>
- Baker, M. (2013). *Every page is page one: Topic-based writing for technical communication and the web*. XML Press.
- Batova, T. (2014). Component content management and quality of information products for global audiences: An integrative literature review. *IEEE Transactions on Professional Communication*, 57(4), 325–339.
- Bellamy, L., Carey, M., & Schlotfeldt, J. (2012). *DITA best practices: A roadmap for writing, editing, and architecting in DITA*. IBM Press.
- Brezina, V. (2018). *Statistics in corpus linguistics: A practical guide*. Cambridge University Press.
- Brezina, V., Weill-Tessier, P., & McEnery, A. (2020). *#LancsBox v. 5.x*. <http://corpora.lancs.ac.uk/lancsbox>
- Brown, G., & Yule, G. (1983). *Discourse Analysis*. Cambridge University Press.
- Carroll, J. M. (1990). *The Nurnberg funnel: Designing minimalist instruction for practical computer skill*. The MIT Press.
- Carter, R., & McCarthy, M. (2006). *Cambridge grammar of English: A comprehensive guide; spoken and written English grammar and usage*. Cambridge UP.
- Citrix. (2019). *Citrix virtual apps and desktops*. Citrix.
- Clark, K. (2009). Elements of style for machine translation. *Multilingual writing for translation, getting started: Guide, October/November 2009*.
- Druva. (2019a). About using SCIM for user management in Druva InSync. *InSync User Documentation*. Druva.
- Druva. (2019b). Archived release notes and fixed issues. *Phoenix User Documentation*. Druva.
- Druva. (2019c). Manage disaster recovery plan. *Phoenix User Documentation*. Druva.
- Eble, M. F. (2003). Content vs. product: The effects of single sourcing on the teaching of technical communication. *Technical Communication; Washington*, 50(3), 344.
- Evia, C. (2019). *Creating intelligent content with lightweight DITA*. Routledge.
- Fabb, N. (1990). The difference between English restrictive and nonrestrictive relative clauses 1. *Journal of Linguistics*, 26(1), 57–77. <https://doi.org/10.1017/S0022226700014420>
- Flanagan, S. (2015). Intelligent Content Editing: A Prototype Theory for Managing Digital Content. *International Journal of Sociotechnology and Knowledge Development (IJSKD)*, 7(4), 53–57. <https://doi.org/10.4018/IJSKD.2015100104>
- Fowler, H. W., & Crystal, D. (2009). *A dictionary of modern English usage*. Oxford University Press.
- Geisler, C., & Swarts, J. (2019). *Coding streams of language: Techniques for the systematic coding of text, talk, and other verbal data*. University Press of Colorado. <https://wac.colostate.edu/books/practice/codingstreams/>

Signaling Context in Topic-Based Writing

- Gillespie, R. (2017). DITA and topic-based writing: Flip sides of the same coin? *CIDM*. <https://www.linkedin.com/pulse/dita-topic-based-writing-flip-sides-same-coin-rob-gillespie/>
- Halliday, M. A. K., & Matthiessen, C. M. I. M. (2004). *An introduction to functional grammar* (3rd ed.). Arnold Publishers.
- Hardie, A. (2014). *Log Ratio – an informal introduction* | ESRC Centre for Corpus Approaches to Social Science (CASS). <http://cass.lancs.ac.uk/log-ratio-an-informal-introduction/>
- Hinrichs, L., Szmrecsanyi, B., & Bohmann, A. (2015). Which-hunting and the Standard English relative clause. *Language*, 91(4), 806–836. <https://doi.org/10.1353/lan.2015.0062>
- Hitachi. (2019a). *Hitachi command suite tuning manager 8.6*. Hitachi Group.
- Hitachi. (2019b). *Hitachi data ingestor 6.4.5-01*. Hitachi Group.
- Hitachi. (2019c). *Hitachi data ingestor cli administrators guide*. Hitachi Group.
- Hitachi. (2019d). *Hitachi data ingestor cluster administrator's guide 6.4.5-01*. Hitachi Group.
- Hitachi. (2019e). *Hitachi data ingestor installation guide 6.4.6-02*. Hitachi Group.
- Horn, R. E., Nicol, E. H., Kleinman, J. C., & Grace, M. G. (1969). *Information mapping for learning and reference*. Information Resources Inc.
- IBM. (2014). *DeveloperWorks editorial style guide*. (2014, May 31). <http://www.ibm.com/developerworks/library/styleguidelines/index.html>
- Kantner, L., Shroyer, R., & Rosenbaum, S. (2002). Structured heuristic evaluation of online documentation. *Proceedings IEEE International Professional Communication Conference*, 331–342.
- Kohl, J. R. (1999). Improving translatability and readability with syntactic cues. *Technical Communication*, 46(2), 149–166.
- Landis, J. R., & Koch, G. G. (1977). The measurement of observer agreement for categorical data. *Biometrics*, 159–174.
- Motorola. (2020). *Motorola mg7550 router documentation*. Motorola.
- NetApp. (2019a). *Performing system administration*. NetApp.
- NetApp. (2019b). *Understanding audit messages*. NetApp.
- Pennebaker, James W. (2011). *The secret life of pronouns: What our words say about us*. Bloomsbury Press.
- Pirolli, P., & Card, S. (1999). Information foraging. *Psychological Review*, 106(4), 643–675. <https://doi.org/10.1037/0033-295X.106.4.643>
- Priestley, M., Hargis, G., & Carpenter, S. (2001). DITA: An XML-based technical documentation authoring and publishing architecture. *Technical Communication*, 48(3), 352–367.
- Rockley, A. (2001). The impact of single sourcing and technology. *Technical Communication*, 48(2), 189–193.
- Rockley, A., Manning, S., & Cooper, C. (2009). *DITA 101: Fundamentals of DITA for authors and managers*. The Rockley Group.
- Samuels, J. (2013). *Getting started with topic-based writing*. TechWhirl. <https://techwhirl.com/getting-started-with-topic-based-writing/>
- Sanders, T. J., & Noordman, L. G. (2000). The role of coherence relations and their linguistic markers in text processing. *Discourse Processes*, 29(1), 37–60.
- Sanders, T., Land, J., & Mulder, G. (2007). Linguistics markers of coherence improve text comprehension in functional contexts. *Information Design Journal*, 15(3), 219–235.
- SAS. (2019). *SAS® event stream processing 6.1: Connectors and adapters*. SAS Institute.
- Scott, M. (1997). PC analysis of key words—And key words. *System*, 25(2), 233–245.
- Spyridakis, J. H. (1989). Signaling effects: Increased content retention and new answers—part II. *Journal of Technical Writing and Communication*, 19(4), 395–415. <https://doi.org/10.2190/493Q-703B-JBVD-E0T9>
- Strata Decision Technology. (2019). *StrataJazz managing staffing and pay practices opportunities*. Strata Decision Technology.
- Stubbs, M. (1996). *Text and corpus analysis: Computer-assisted studies of language and culture*. Blackwell Publishing.
- Tanium. (2019a). *Tanium Connect User Guide 4.11.1*. Tanium.
- Tanium. (2019b). *Tanium™ IaaS cloud solution deployment guide for Microsoft Azure*. Tanium.
- Temperley, D. (2003). Ambiguity avoidance in English relative clauses. *Language*, 79(3), 464–484.
- TIBCO. (2019). *TIBCO REST Implementation*. TIBCO.

Vernier. (2019). *Centripetal Force Apparatus*. Vernier.

Wachter-Boettcher, S. (2012). *Content everywhere:*

Strategy and structure for future-ready content.

Rosenfeld Media.

Williams, J. M. (1997). *Style: Ten lessons in clarity and grace* (5th ed.). Addison Wesley.

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Helping Content Strategy: What Technical Communicators Can Do for Non-Profits

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By Guiseppe Getto and Suzan Flanagan

ABSTRACT

Purpose: Contemporary non-profit organizations must reach a variety of audiences in order to sustain themselves and must compel these audiences to take action on behalf of a specific cause. At the same time, past research has indicated that non-profit professionals often lack the necessary training and expertise to leverage digital technologies for effective communication. This research study explores how technical communicators can assist non-profits by helping them develop effective content strategies.

Method: This report of research findings is based on an ongoing Participatory Action Research (PAR) project, which included a series of focus groups with representatives of thirteen different organizations as well as interventions with several other organizations. The goal has been to learn about and help improve non-profit content strategy in the community of Greenville, North Carolina.

Results: We found that while non-profits do rely on a variety of media to fulfill their goals, they prefer pre-digital media. Our participants also defined audiences in a very loose manner, used content in a non-targeted way, and favored existing organizational processes over content strategy best practices.

Conclusions: Ultimately, we provide several ways technical communicators can assist non-profits through low-cost or free consulting and the development of educational materials. We hope that fellow professionals will engage in this necessary work because non-profits in the United States form an important “third sector” of the economy that provides essential services to countless individuals.

KEYWORDS: content strategy, non-profit, technical communication, participatory action research (PAR), social justice

Practitioner's Takeaway

- Contemporary non-profit organizations need help with content strategy in order to reach their intended audiences.
- We conducted a focus group with several non-profits and determined that they are largely unaware of content strategy best practices including audience targeting, content planning, and melding organizational goals with content goals.
- Technical communicators can help local organizations improve their content strategy processes.
- Technical communicators can help improve content strategy processes through service work or low-cost consulting.

INTRODUCTION

To sustain their organizations, non-profits must reach a variety of community audiences, including potential volunteers, donors, funders, and clients, as well as existing supporters and clients of their organization. As organizations they must often compete for media attention and funding with other non-profits as well as with small businesses and corporations. Successful non-profits must also build and sustain a compelling web presence in order to interact with community audiences, many of whom use contemporary communication channels such as search engines, social media, and blogs to get updates on their favorite causes and charities. As many in the field of technical communication know, these newer media require the development of a content strategy if they are to be deployed effectively. At the same time, the most recent extant large-scale research on non-profit communication has shown that non-profits struggle to use these newer media to reach their goals (Kenix, 2008; Zorn, Flanagan, & Shoham, 2010). Years later, however, it is unclear whether non-profits have improved their use of digital media or have adopted alternative content strategies.

And though most technical communication practitioners work in a corporate setting, many also volunteer with non-profits in their local communities.¹ To date, there has been no systematic research into the various ways technical communication practitioners volunteer with non-profits, but anecdotally, practitioners have reported to us that they volunteer in a variety of ways, including by providing free writing or editing services; helping organizations optimize, or even design, a website; helping organizations market themselves over social media or other online channels; and helping organizations with grant writing. In addition, some non-profits employ communication specialists of various stripes to help improve their internal communication and fundraising efforts, and sometimes these positions are filled by people with formal training in technical communication. Finally, within the academic community, there is a small, but

consistent body of literature that seeks to meld the teaching and research of technical communication within academia with the goals of non-profit and other community-based organizations (Blythe, Grabill, & Riley, 2008; Crabtree & Sapp, 2004; Dush, 2014; Gonzalez & Turner, 2017; Grabill, 2004, 2007; Flanagan & Getto, 2017). What we are missing as both scholars and practitioners, however, are answers to the following research questions:

1. What media do contemporary non-profit organizations typically utilize to fulfill their content goals and to reach their intended audiences?
2. What strategies do contemporary non-profit organizations employ when developing and deploying various kinds of content in order to communicate with these audiences?
3. How can technical communicators, content strategists, and other communication-oriented professionals help non-profits improve their content strategies?

To answer these questions, we examined the content strategies of thirteen different non-profit organizations via a series of focus groups conducted in a community within the rural American South: Greenville, North Carolina. Twenty staff and volunteers from these organizations reported to us that though they are attempting to incorporate new technologies into their content strategies, most feel unprepared to do so in a strategic manner. And having followed several of them closely since the original study, we have seen improvement in their content strategies, though we still see significant obstacles to these organizations accomplishing their content goals and reaching their intended audiences.

Below we detail the status of research on non-profit content strategy within the field of technical communication and related fields. We discuss our methodology for conducting our research. And we discuss our findings from this research, which include:

- non-profits rely on older media in favor of newer media;
- non-profits use loosely defined audiences;

¹ To our knowledge, there has been no formal research study of technical communicator volunteer habits. From talking to many technical communication practitioners over the years, however, we have anecdotally heard many stories of volunteer work with non-profits that focus on their professional skill sets. Academics who research and practice technical communication tell similar stories of volunteer work with non-profits. Whenever we aren't able to cite formal research throughout this article, then, we are relying on this anecdotal experience that goes back about 20 years of combined work in this area.

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- non-profits struggle to employ consistent and effective content strategies; and
- technical communicators and like-minded professionals who want to work with non-profits can help these organizations in a variety of ways.

Our chosen methodology, participatory action research (PAR), balances rigorous research investigation with intervention. It is a collaborative approach to solving problems in communities with various stakeholders. Because of this approach, one major goal of this article is to encourage technical communication researchers, teachers, practitioners, and students to use their skills as communication professionals to help non-profits. After all, as we explore throughout this article, non-profit organizations in the United States often provide needed services to a wide variety of residents from people experiencing homelessness to survivors of childhood cancer, services that are simply not available outside of the non-profit sector due to our dwindling welfare state. And as we discuss in our implications, one of the most common capacities that non-profits lack is something that many technical communicators are expert in: the ability to create an effective content strategy.

LITERATURE REVIEW: WHAT NON-PROFIT CONTENT STRATEGY MEANS FOR THE U.S. AND TECHNICAL COMMUNICATION

Providing Necessary Services

When compared to other developed democracies with stronger welfare states, non-profit organizations in the United States (U.S.) form a third sector of the economy, balancing the lack of available public services in some cases (Alexander, Nank, & Stivers, 1999; Morgan & Campbell, 2011; Pennerstorfer & Neumayr, 2017). As compared to many European countries with socialized medicine, for example, U.S. healthcare has created the necessity for non-profits that do everything for U.S. residents from providing assistance with signing up for health insurance to providing support to families dealing with spiraling medical costs (Nafi, 2019). Because of the outsized role that non-profits play in the U.S., their contributions to our way of life should not be underestimated. And though many non-profits receive public funding in the form of grants and other subsidies, this funding only accounts for 31.8% of non-profit budgets, nationally. The largest portion of funding (49%) comes from fees charged for services. In

addition, donations account for 14% of overall budgets, of which individual donations are the largest portion at 8.7% (National Council of Non-Profits, 2020).

So, in a very real sense, the non-profit sector in the U.S. provides services that are heavily incorporated into the welfare state of many developed democracies. And non-profits are not guaranteed funding to do this work, meaning that they are at constant risk of losing funding and thus losing their ability to provide these services to community members. They are not unlike small businesses within our economy: they must reach various audiences and compel those audiences to action if they are to stay in operation. As opposed to small businesses whose primary focus is reaching and attracting customers, however, non-profits must also attract and retain volunteers, donors, funders, and clients to survive. At the same time, with budgets that can often shift from year to year, or even month to month, the vast majority of non-profits do not have sizable budgets for traditional advertising across older media like radio, newspapers, and television.

Technical Communication and Content Strategy

Technical communication is a wide-ranging field that encompasses many skill sets. Like related fields such as user experience design (UX), information technology (IT), and marketing, it involves a variety of strategies, practices, and professions. There have been several attempts to define technical communication as a coherent field. Like many communication-focused fields, however, these definitions remain somewhat nebulous, but include:

- a field devoted to the creation of instruction manuals and other supporting documents to communicate complex, technical information (Bureau of Labor Statistics, 2021);
- a field devoted to the communication of specialist knowledge to a variety of audiences using various technologies and media (Society for Technical Communication, 2021);
- a field devoted to the use of critical discourse mobilized for various types of social action (Sullivan, 1990, p. 381); and
- a collection of conceptual and practical skills paired with a flexible notion of communication (Henning & Bemer, 2016, p. 315).

For our purposes, technical communication is a field in which its researchers and practitioners have

in common an expertise in communicating complex, technical information through various skills, media, and genres. This field entails such wide-ranging skill sets as:

- Writing
- Editing
- Oral communication
- Cross-functional teamwork
- The creation, publication, and distribution of various, specific genres of documentation (i.e., manuals, help guides, support forums, informational websites, etc.)

Content strategy is a diverse field that intersects technical communication in several areas, but also boasts skills, workflows, and definitions all its own. The industry literature on content strategy is extensive and comprises numerous books, blogs, reports, whitepapers, articles, online magazines, newsletters, podcasts, videos, and other digital resources, many of which are produced by consulting companies like Brain Traffic, Content Rules, Scriptorium, and Simple [A] or by websites like A List Apart (e.g., Halvorson, 2008) and the Content Wrangler (e.g., Caldwell, 2020). Among these trade publications covering the topic are several issues of *Intercom* (e.g., Ames, 2019; Porter, 2013; Saunders, 2019) and books such as *Content Strategy for the Web* (Halvorson & Rach, 2012), *Designing Connected Content* (Atherton & Hane, 2018), *The Language of Content Strategy* (Abel & Bailie, 2014), and *Managing Enterprise Content: A Unified Content Strategy* (Rockley & Cooper, 2012), in addition to many others (e.g., Bloomstein, 2012; Casey, 2015; Nichols, 2015; Rockley, Cooper, & Abel, 2015; Wachter-Boettcher, 2012).

In contrast, much of the recent academic literature on content strategy can be found in journal special issues that feature applied research, integrative literature reviews, and case studies (Bailie, 2019; Batova & Andersen, 2015, 2016b; Pullman & Gu, 2008; Walwelma, Sarat-St. Peter, & Chong, 2019) as well as two edited collections (Bridgeford, 2020; Getto, Labriola, & Ruszkiewicz, 2019).

Much of this collective work has been definitional. For example, Halvorson (2008) first defined content strategy as a field that “plans for the creation, publication, and governance of useful, usable content.” Bailie (2013) defined content strategy as “a repeatable process that governs the management of the content throughout the entire content lifecycle” (p. 12). Andersen and Batova (2015), defined content

strategy as both “an interdisciplinary area of practice characterized by methodologies, processes, and technologies that rely on principles of reuse, granularity, and structure to allow communicators to create and manage information as small components,” and later as a “unifying approach” to “integrating organizational and user-generated content” and connecting with stakeholders, depending on its focus (Andersen & Batova, 2015, p. 242; Batova & Andersen, 2016b, p. 2). Clark (2016) traced the shifts from single sourcing to content management systems to content strategy and identified multiple industry-based definitions of content strategy.

For us, two members of the academic field of technical communication who also work sometimes as content strategy practitioners, content strategy is about:

- organizations setting realistic goals for information that is presented in a variety of formats;
- organizations thinking strategically about who is reading their content and why;
- organizations realizing that content strategy is a cyclical, iterative process that is never definitively solved; and
- organizations developing a strategic plan and vision for content.

This is also a fair summation of the field of content strategy, at least as it intersects technical communication. Many, if not most, of the scholars and practitioners cited above would likely agree that those four aims are all important to content strategy. But what do such aims mean for non-profits? We turn to that next.

Non-Profit Content Strategy

What unifies the above four aims under the rubric content strategy for us is the alignment of content goals with organizational goals. To be effective at reaching core audiences, all organizations should implement a content strategy, including non-profits. But due to many of the economic factors we mentioned above, in addition to the lack of training available for non-profit managers to learn about content strategy, many non-profits struggle to successfully adopt consistent content strategies. This doesn't mean they lack for content, however. As Lauth (2014) points out, the content ecology of modern non-profits comprises elements such as:

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- nonprofit stakeholders (i.e., donors, volunteers, employees, clients, and communities served);
- communication channels (e.g., print, websites, social media);
- devices upon which content will be encountered by core audiences (e.g., desktop, tablet, mobile);
- physical infrastructure (e.g., brick-and-mortar buildings, cloud-based content repositories, devices used to manage content);
- fundraising activities;
- needs assessments; and
- core organizational content-related processes (e.g., the development of a mission statement, the development of brand materials).

Content itself is defined for our purposes as *useful information made available to at least some audiences*, and may include articles, blog posts, newsletters, status updates, tweets, images, logos, videos, etc. For our purposes, the form content takes is less important than the ecology in which it exists. Non-profit organizations must strive to understand this ecology and leverage it to create useful information for their core audiences.

Here we echo many practitioners in contending, as Pope, Isely, and Asamoah-Tutu (2009) do, that “traditional marketing strategies do not work for nonprofit organizations” because their organizational goals differ from for-profit businesses (p. 184). This can also be said for communication strategy, a closely related discipline that focuses on the development of organization-wide tactics for leveraging various communication channels (Klein, 1996; Kohut & Segars, 1992; Littlemore, 2003). What sets content strategy apart from something like marketing or communication strategy is the emphasis on various forms of *content*, meaning information purveyed to an audience, instead of a sole focus on communication channels. One could argue that marketing, communication strategy, and content strategy only differ by their emphasis on various parts of the organizational communication situation.

What differentiates *non-profit* content strategy from other forms of content strategy are the specific challenges non-profits face. Nonprofits target stakeholders—which include clients, employees, volunteers, and donors—with diverse needs. Since the modern web provides nonprofit organizations with low-cost infrastructures for communicating their organizational goals to their stakeholders, non-profits

need to think strategically about content management and need to integrate their users’ needs with their organizations’ mission (Hart-Davidson et al., 2008). In order to accomplish this, we argue that what non-profits really need is a non-profit content strategy that integrates a holistic approach to content, including a concrete sense of goals, channels, and audiences (Content Marketing Institute, 2016; Hart-Davidson et al., 2008; Lauth, 2014; Pope, Isely, & Asamoah-Tutu, 2009). This strategy must be mapped out and documented in written form so that all current and future stakeholders of a given organization can understand and enact the steps. As we explain in our study below, however, it’s exactly the *strategy* part of content strategy that serves as an obstacle for many non-profits.

METHODOLOGY: DEVELOPING NON-PROFIT CONTENT STRATEGY CAPACITIES THROUGH PAR

Our methodology for investigating and improving non-profit content strategies is PAR. PAR is a collaborative, community-based methodology that invites researchers to not only investigate problems in their local communities, but also to use their research to help intervene in these problems (Brydon-Miller, Greenwood, & Maguire 2003; Eady, Drew, & Smith, 2015; Small & Uttal, 2005; Somekh, 2006). Within the academic field of technical communication, PAR has been taken up by only a few researchers, who have used it to improve communication capacities in local communities (Blythe, Grabill, & Riley, 2008; Crabtree & Sapp, 2004). It is unclear why the methodology has not been taken up by more researchers who are doing engaged research projects with communities, especially considering the strong history of engaged research within the field. It is possible that the focus has been on developing user-centered research methodologies and paradigms rather than on adopting ready-to-hand methodologies when doing engaged research (e.g., Mara & Mara, 2015). Regardless, PAR provides a useful methodology for developing engaged research projects that focus on content strategy due to its iterative and collaborative structure.

As Somekh (2006) describes some of the core tenets of this methodology:

- Action research integrates research and action in a series of flexible cycles.
- Action research is conducted by a collaborative partnership of participants and researchers.
- Action research involves the development of knowledge and understanding of a unique kind . . . the involvement of participant-researchers who are ‘insiders’ . . . gives access to kinds of knowledge and understanding that are not accessible to traditional researchers coming from the outside.
- Action research starts from a vision of social transformation and aspirations for greater social justice for all.
- Action research involves a high level of reflexivity (pp. 6–7).

In other words, PAR invites researchers to treat research participants as co-researchers in the investigation of social problems. It assumes that such research projects will be messy, collaborative, and open-ended. And it requires researchers to actively engage in self-reflexive activities during research to ensure that all research activities are equitable, just, and cognizant of power differences between researchers and participants.

METHOD

Project Background and Community Need

As with all PAR projects, this one began with a community need. In this case, in the spring of 2014 a local area non-profit director, Fernando, and a local independent community outreach specialist, Stacy, approached Guiseppe separately on several different occasions to express the need for non-profit training in effective communication.² This need was variously expressed as a need for help with websites, social media, and digital marketing. Through a series of conversations with Fernando and Stacy, Guiseppe realized that their expressed needs might represent a more systemic problem within the local community of Greenville, North Carolina, a mid-sized, rural city in the American South. Though the community boasts a broad array of non-profit organizations, both Stacy and Fernando strongly felt that many of their fellow non-profit professionals were largely relying on the goodwill of others to maintain their web presences.

Though Guiseppe had helped local organizations referred to him by both Fernando and Stacy, he

wondered if a research project into the roots of the problem might reveal a way to help local non-profits improve their digital communication without having to work on a seemingly endless series of in-depth, ad hoc projects with each organization he encountered. Since Stacy and Fernando were enthusiastic about this prospect, in the summer of 2015 Guiseppe began developing with them a multi-stage research project that he felt would best uncover compelling findings, which they thought would best serve community needs. This project was envisioned as having three initial stages:

- **Stage 1:** data collection/needs assessment regarding the communication capacities of local non-profits
- **Stage 2:** preliminary data analysis and design of intervention
- **Stage 3:** deployment of intervention and assessment of impact

This loosely-bound study design was intentional as PAR projects must often be adapted on-the-fly as new community needs arise or old needs shift. Suzan would join the study partway into stage 1 as a facilitator of key moments of data collection, and would participate in various ways throughout the rest of the study, including as a workshop facilitator, data analyst, and partner on initial interventions.

In a larger sense, however, we simply don't have enough empirical data at this point to suggest a specific approach to content strategy work with non-profits. What we do have are a few surveys of non-profit preferences regarding the use of internet-based communication technologies, both of which are somewhat dated at this point. Zorn, Flanagan, and Shoham (2010) surveyed more than one thousand non-profits in New Zealand and found that many organizations utilized tools such as email and simple databases for stakeholder engagement but had failed to successfully adopt websites as a key communication venue for reaching community audiences. The researchers tracked a variety of variables in their survey data and found that decision-maker knowledge of technology and the willingness of organizational leadership to adopt new technologies were two key predictors of the extent to which a given non-profit adopted new communication technologies. Kenix (2008), on the other hand, conducted seven focus groups across the U.S. with 52 professionals responsible

2 Participants' names have been changed to protect their identities as per their request.

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for creating “internet strategy and/or web content for nonprofit organizations” (p. 407). She found that her participants largely followed a one-way dissemination model for sharing information online and demonstrated a lack of understanding when it came to developing a coherent strategy.

Data Collection

The nascent status of work on non-profit content strategy coupled with the need to assess an entire community’s needs called for a method of data collection that would assure a diverse pool of participants were recruited for research. For the purposes of generalizability, a survey design seemed most appropriate, as the largest known study to date employed this method (Kenix, 2008). When presented with this option, however, both Fernando and Stacy explained that most of their non-profit colleagues were hesitant to fill out surveys from people they didn’t personally know. Stacy suggested that “just getting people in a room together to have a conversation” would be the best way to generate interest in the study. In order to meet this community exigence while still employing a sound research design, focus groups emerged as the clear choice.

In total, three focus groups with non-profit professionals were held within the community of Greenville, North Carolina from February 2016 through April 2016 to discuss their use of digital media within their respective organizations. Focus groups were organized around a series of questions related to goals, audiences, and channels used by participants and were conducted by a professional focus group moderator hired through funding for the project, Suzan (Appendix A). Twenty staff and volunteers from thirteen different non-profit organizations were recruited from a pool of 36 organizations to discuss their use of digital media and their unmet needs for content strategy. Because existing strategies, learning needs, and organizational needs were not well understood at the inception of the study, and because the study asked participants to self-report this data during focus groups, participants were placed into heterogeneous focus groups (Stewart & Shamdasani, 2015, p. 26) via random sampling. Focus groups included six to eight individuals and engaged participants in conversations regarding existing strategies they use for digital media, organizational needs that involve digital media that are currently

unmet, and new content strategies they are interested in learning.

Data Analysis

In order to uncover the status of local non-profit content strategies, the following forms of treatment and analysis have been deployed on data rendered from the three focus groups conducted to date:

- transcription of all focus group audio data into dialogue form;
- an initial coding pass to note initial themes in this data for use in later coding passes (Getto, 2017);
- use of these themes and member checks to develop and deploy a preliminary intervention in the form of a free class on content strategy for non-profits that included a free handbook on this topic for all participants (Appendix B);
- a secondary coding pass to check initial themes against the corpus of data and to ensure inter-rater reliability between the authors; and
- continual interventions in the form of ongoing educational opportunities and service-learning partnerships with local non-profits.

It is noteworthy that the final coding pass happened after the initial intervention. This is not uncommon in the practice of PAR as communities are often hungry for results. Academic research takes time to produce findings rigorous enough to warrant publication in peer-reviewed venues. At the same time, community partners’ problems are often immediate and require intervention.

PAR projects require that researchers act as much (or more) in the best interests of community members as they do in the best interests of study design. Our decision to deploy initial interventions based on preliminary findings was thus influenced by a variety of local factors. For example, due to institutional processes, the funding for the project that enabled the production of a handbook on content strategy for participants in the project was time sensitive, and only allowed for the above-mentioned forms of analysis before the intervention was deployed (Appendix B). This move to deploy interventions before final data analysis was thus a response to participant needs, several of whom had been involved with the project since its inception. As readers are no doubt aware, academic timelines often stretch stakeholder patience. Rather than achieve the level of academic rigor required of

reports of research findings before the intervention was deployed, we would claim that the above forms of analysis balanced rigor with community exigences. In addition, as interventions have been ongoing largely since the summer of 2016, we have learned a lot about what our data meant in the context of the local community and our attempt to help organizations build consistent content strategies. We have a much better sense now of how the story of this project ends than had we simply relied on our focus group data without continuing contact with the local community.

Regardless, between our initial and final coding pass, we would solidify the following codes as representative of our data (Table 1).

Table 1. Codes Used for Final Coding Pass

Goal	An aim
Audience	Group of people non-profits are trying to reach
Strategy	Means of achieving a goal
Medium	Channel through which a message is delivered

In addition, to ensure inter-rater reliability (IRR), we calculated the following using Cohen's kappa (Neuendorf, 2017; Krippendorff, 2019) (Tables 2 and 3).

Table 2. Raw IRR Coding Counts

	Agree	Disagree	Simple % Agreement
Goal	403	88	82.077%
Audience	416	75	84.725%
Strategy	365	126	74.338%
Medium	427	64	86.965%
Overall simple % agreement	-	-	82.026%

Table 3. Calculations of IRR via Cohen's Kappa (95% CI or confidence interval)

	IRR	Kappa
Goal	82.077% +/- 3.392	.798 +/- .072
Audience	84.725% +/- 3.182	.827 +/- .0007
Strategy	74.338% +/- 3.863	.712 +/- .0009
Medium	86.965% +/- 2.977	.830 +/- .015
Overall	82.026% +/- .866	.814 +/- .00008

Depending on the source, 70% IRR is considered sufficient for qualitative data, so after these calculations, we were confident that our coding was in sync (Boettger & Palmer, 2010; Neuendorf, 2017).

And from this analysis, we were able to render compelling findings regarding how technical communicators can help non-profits with their content strategies. Specifically, as we explore below, we found that while non-profits do rely on a variety of media to fulfill their goals, they preferred pre-digital media. Our participants also defined audiences in a very loose manner and used content in a non-targeted way. We also found that their content strategies tended to favor existing organizational processes over content strategy best practices, which they were largely unaware of. And finally, we found that technical communicators can most help non-profits by teaching them how to better leverage their content in a holistic manner.

RESULTS AND DISCUSSION

Non-Profit Organizations Rely on a Variety of Media to Fulfill Their Goals, but Prefer Pre-Digital Media

The first major finding from our research is that the non-profit participants of our study did use a variety of media to communicate with audiences in order to reach their goals. This media ranged from more traditional media like local news coverage to interactive websites and social media campaigns. The most common channels used by participants were as follows:

- organizational website
- Facebook
- news coverage
- email newsletter
- paper newsletter
- face-to-face

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Nearly every participant used these six channels when communicating with core audiences, though members of a few newly established organizations had not managed to develop an organizational website yet. Only a few individuals reported using more advanced tools like website or social media analytics, and even among these individuals, it was clear they were not being used consistently or with specific goals in mind. Many paid online marketing opportunities, such as the Google for Non-Profits Grant (<https://www.google.com/grants/>) or paid Facebook ads to promote an organization page in order to garner donations, were largely unknown to participants.

Many participants were also skeptical of digital media, saying they preferred, in the words of one participant, media that would provide a “personal connection.” Though all participants agreed that digital media were important to their outreach efforts, most said they didn’t feel entirely comfortable using those media or even felt disingenuous doing so, like they were marketing instead of just speaking with existing and potential supporters about their cause, to paraphrase another participant. The medium most preferred amongst participants was “face-to-face,” which participants seemed to define as the act of talking to local community audiences informally in a social setting. This medium was directly referenced ten times during our focus groups, but most participants agreed with this sentiment during ensuing discussions. It was clear from many participants that they felt that digital media were the opposite of “face-to-face,” because they felt digital media didn’t allow for the informal types of interaction that they found valuable.

The main value they found in digital media was a term familiar to anyone working with non-profits: “outreach.” Within the non-profit community, the term tends to mean the act of reaching out beyond existing supporters and people currently benefiting from the non-profit’s services. The word “outreach” was used nine times within our data directly, but this idea of using digital media to go beyond a current audience of stakeholders arose many times during our focus groups. Here’s a passage from one participant that is representative:

Okay, those are domestic violence clients, trying to do an outreach with them. Letting them know that we have services. That’s always a big issue: trying to get the word out, because sometimes people don’t

know, even though we’ve been here for over 30 years. And sometimes people don’t know that. So, trying to get the word out because we don’t have a budget like Coca-Cola or Budweiser to advertise during the Super Bowl. This idea of “trying to get the word out” was seen as a primary goal of adopting newer media, because traditional media were largely seen as venues for reaching existing supporters.

Anyone familiar with audience targeting within content strategy best practices probably already sees the issue with this approach to communication. Rather than zeroing in on a particular audience to target, developing content specifically for that audience, and then delivering content within the media channels preferred by those audience members, participants largely saw their content as a way to reach a nebulous public that would hopefully become aware of their message and support them. This loose definition of audience was a major issue we uncovered in our participants’ approach to content strategy and is a topic we turn to next.

Non-Profit Organizations Define Audiences Very Loosely and Largely Use a “Spray and Pray” Approach to Content Strategy

If participants saw their outreach efforts as instances in which they would hopefully snag additional supporters from a nebulous public, then it makes sense that their definition of audience was loose and ill-suited to targeting specific individuals. Below is a representative passage from a participant:

Well, our audience is anybody that lives in the community, and as far as social purpose, we like to argue that we sequester carbon dioxide, and we provide shade in the summer, which eventually we’ll need that shade to be cooling things down. We have educational programs, and we also got a grant. We got with the Dream Park and with the Community Center. The [Community Crossroads Center], which used to be called the homeless shelter, couldn’t afford their landscaping, so we provide them with landscaping, and we’re going to work with Rebuild Together this year. So, we have some social purpose, but mostly it deals with deforestation and the lack of care that our trees get, both canopy trees and understory trees in the city limits.

Like this participant, our focus group members largely saw their audience as intimately tied to their mission. Their audience was people who thought their mission was important and people who would simply see the value in their mission and become supporters. Participants also largely saw their audience as located within their service area.

Content strategists and like-minded professionals (i.e., digital marketers, business consultants, content managers, etc.) sometimes refer informally to this approach to reaching audiences as the “spray and pray” method. The idea is that if enough people are reached with a message, then they will become interested in that message purely through saturation. This approach is still promoted by traditional marketers, whose ability to target specific audiences is somewhat limited. Taking an advertisement out in a newspaper gives an organization access only to the subscribers of that newspaper and doesn’t allow for pushing a message to selected individuals within a larger group.

And like traditional marketers, our participants saw their outreach as a simple process of reaching people in the local community who think like they do. In the above example, the audience would be anyone in the local community who values planting trees. However, this approach goes against content strategy best practices, in which organizations zero in on specific audiences and create content tailored to them. Though there are a variety of components of content strategy, when dealing with audiences, there is general agreement that audiences should be specific (Abel & Bailie, 2014; Albers, 2003; Rockley, Cooper, & Abel, 2015, p. 2). Energized by digital media that provide much more specific audience targeting options, the authors of much of the literature that we cited in our literature review echo that the best practice is that content should be personalized for specific audiences. The point is not to simply put a message out to a large group of people and hope they become supportive of that message. The point is to develop a message that specific types of individuals will find valuable and will be attracted to.

Search engine optimization is a perfect example of this type of audience targeting, as people only find information through search engines when searching for keywords. So, putting content online that doesn’t take advantage of specific keywords tied to a specific audience is useless as it will never be seen by the intended group of people (Rockley, Cooper, & Abel,

2015, p. 6). Rather, content strategists who develop content for the web will typically identify search patterns that are tied to key audience demographics. In this case, the above non-profit could gather data on what local clubs are looking for when they search for service projects. Once these search patterns are identified, the challenge is to develop search-friendly content that will attract users.

This data-driven approach to content development that targets specific audiences was unknown to the vast majority of our participants. In fact, only three participants (15%) demonstrated any knowledge of audience targeting. And of these, only one participant (5%) demonstrated accurate knowledge of how to actually *do* audience targeting. The vast majority of participants were aware of their limitations when it came to defining audiences, however, as can be seen in the passage below:

I think it’s hard to measure communication and what’s effective and what’s not effective. Facebook, I think, sometimes we think we’re going to get more of a response than we actually do. I feel like Facebook was something that we’re trying to work on, just to build up, and get more people. In terms of ineffective, I think that it’s hard to say. Because I don’t know that we have defined communication goals. I don’t think that we have, ‘we want to reach this many people with this message or this method of communication.’ I don’t think the fact that we don’t have set goals makes it harder to measure. Or, I don’t know what the goals are because I don’t do a lot of outreach.

This participant was representative in that they appear unaware of best practices for determining effective audience targeting via a specific channel. Participants in our second group, which was populated by the sole participant who knew about audience targeting, an intern with a participant organization who also happened to be a PR major at our local university, were surprised to learn that Facebook came with an analytics suite.

Thus, it is safe to say that, like traditional marketers trying to sell ad space based on a predetermined group, our participants saw content strategy as largely a process of trial and error. Content that reached audience members and persuaded them to become supporters was seen as valuable. Content that didn’t was perhaps seen as necessary, but in a limited capacity. Of course,

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without hard data to support these claims, it is only natural that participants would primarily value face-to-face communication. Face-to-face communication entails instantaneous feedback from an audience. Supporters who attend an event can be given a physical clipboard to sign up for a newsletter or can make donations on the spot. They can be engaged in interactive, real-time conversations.

It is not that participants found no value in newer forms of content, such as blog posts, social media posts, and digital advertisements. On the contrary, they saw them as entirely necessary. However, they were unaware that these forms of content often allow for far more precise audience targeting than traditional media. The problem we identified early on in our data analysis was a lack of knowledge, and not one of ideology (though the two are, of course, linked). The main source of this lack of knowledge, as we explore in more detail below, was that participants largely saw their content strategies as being derived from their existing organizational processes rather than as arising from a mutually dependent process for reaching audiences.

Non-Profit Organizations Employ Content Strategies that Favor Existing Organizational Processes

When we asked participants about their content goals, they largely fell back on their organizational goals, thus conflating the two. The following passage is representative of this theme:

I think ours is to promote events. A lot of people rely on Facebook and other social media to promote their events, but if you have an event calendar on your website where it's all mapped out for a month, I think that's a lot more effective. Because with Facebook, you kind of announce them a couple weeks before, and that's one thing our current website struggles with, because the events aren't updated. Any of our board members, although it's typically either the president or the executive director, go in and edit our website, although design and whatnot is done by somebody in our nationals. I think ours will be more effective having, on our new page, we're going to have a scrolling event list. Because, when I'm interested in a nonprofit's events, I look for it on their homepage to see where they're going to be, what they're going to be doing.

As we can see, this participant largely explains their content strategy when it comes to promoting events as driven by the existing organizational process for promoting events. There was a kind of tautology in our participants' thinking about content goals: content was something that fit into predefined containers, containers determined by what the organization was currently doing.

Anyone who has consulted with an organization to help improve content strategy—be it in a non-profit, small business, or corporation—probably recognizes this mindset. Whenever the authors have asked an organization why they develop and deploy their content the way that they do, existing organizational processes and goals are invariably cited as the reason why content must be developed and deployed in a certain fashion. Rockley and Cooper (2012) have called these pre-existing containers “content silos” to indicate how they wall off content creators from one another within the same organization (p. 133). Like many content creators within many organizations, our participants saw existing organizational structures as necessary, permanent, and reasonable. Rather than shaping a message for their audience, they largely shaped their message around what they saw as possible within their organizations and then used this limited range of content to try to reach audience members.

The above participant says their communication goal is to “promote events,” for example. This goal puts a lot of other content in service of a pre-existing container: fundraising events. If the main organizational process of a non-profit is to host face-to-face fundraising events, then all other content should be subsumed under this goal. The problem with this approach is when it fails. There may be supporters who don't want to attend face-to-face events. There may be audience members who remain unaware of events or aren't available when they're being hosted. As we write this article, COVID-19 has been making the lives of many of our existing non-profit partners very difficult for this reason. Though several of them, as we explore in the next section, have adopted more holistic strategies for their content, many others have struggled to adopt newer forms of media and thus have suffered economic losses during the COVID-19 pandemic.

Technical Communicators Can Help Non-Profits by Teaching Them How to Better Leverage Content in a Holistic Manner

So far, we've identified several clear trends throughout all three focus groups we conducted:

1. Though participants did rely on a variety of media to fulfill their goals, they had a strong preference for pre-digital media, largely because they felt digital media were less authentic.
2. Participants defined their audiences very loosely and largely used a "spray and pray" approach to content in which they sent out messaging to an ill-defined group in hopes of reaching like-minded individuals.
3. Participants employed content strategies that favored their existing organizational processes, often siloing their content by what media they viewed as available.

Given what we know about the status of non-profit content strategy, these trends are not particularly surprising. If, as per previous studies on non-profit digital communication, our participants were slow to adopt emerging technologies and advanced techniques for digital communication, it is only because their organizations had developed content strategies based on more traditional methods (Kenix, 2008; Zorn, Flanagan, & Shoham, 2010). Of course, material resource shortages cannot be ignored. Though we did not ask financial questions of our participants, many expressed their willingness to pay for outside consultants to assist them, if they only had the means to do so.

Regardless, given these trends, we needed to design an intervention that introduced participants to best practices in content strategy. Participants needed help learning:

- how to develop a consistent, goal-driven, organization-wide content strategy
- how to identify specific audiences for specific kinds of communication
- how to tailor messaging to specific audiences
- how to integrate this strategy across tools and audiences

Our intervention needed to educate and empower our participants to take control of their content and to think more strategically about how it is used and deployed for specific purposes.

It should also be noted that we engaged in member checks at the end of each focus group in order to ascertain whether such an intervention would be useful. Education was a key theme that emerged from these member checks, as well as from the focus groups as a whole. Participants wanted to learn how to be effective when using newer forms of media. They were aware that their organization lacked staff trained in this area and that they were potentially missing out on opportunities via their websites, social media, email newsletters, and other digital channels. Here is how one participant put it:

I think we have a lot of room to grow. I think we're not utilizing it to anywhere close to its full potential for what we might be able to do out there, for the people we might be able to reach. We have been around Greenville for 15 years, and we have that core base of people that come to our banquet every year, they know us, but then, there are even people who come to our banquet, who have been coming every year, and if someone else asked them what Building Hope was about, they might not be able to tell you. So, I guess trying to get the message across, to reach more new people, and to be able to do that through social media, and I think that's an avenue that would really be helpful for us. And to be able to further explain and to share the vision more-so with our donors who give because they believe in the cause, but they may not be able to explain it to anybody else, because maybe they don't know. They just know that it's a good organization, and they know the little tagline they hear, "Touching lives, transforming communities," and they can re-quote that, but what does that mean? Who are we reaching? Who are we touching? Who are the kids that we're focused on?

This "room to grow" sentiment was echoed by all participants. They were keenly cognizant of the fact that there were limitations to their knowledge and were hungry for anything that might help them reach a wider audience, and thus promote their mission to more people.

Thus, at the very end of each focus group, Guiseppe spoke for the first time after introducing the focus group facilitator and represented what he had learned by listening to participant responses to questions. In all three groups, he represented that he had learned that

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the biggest gap between what participants were doing now and what they wanted to do was knowledge-based. Participants universally agreed with this statement. He then proposed various solutions to this problem, including free classes offered to non-profits over the next several months on the key elements of non-profit content strategy, a free handbook on this topic that participants could take back to their organizations, and potentially the organization of an ongoing community calendar of events that would generally support non-profit management in the local community, but that would also feature ongoing events on effective communication.

Participants responded very positively to these ideas, so in the next several weeks the authors organized the first round of interventions: the development of a class called DIY Digital Marketing for Non-Profits to be offered several times over the summer when we had fewer teaching duties and the development of a free handbook of the same title that would be distributed at this event as well as online (Appendix B).

Overall, we held this course three times over the summer of 2016 and distributed 20 copies of the handbook. In the spirit of PAR, we decided to open the classes to any non-profit professional in the local community. To publicize the event, we went back to the original list of 36 organizations we had found during preliminary research and sent emails to contacts at each of these organizations. We also encouraged all participants who contacted us to spread the word to any other non-profit professionals who might be interested in attending. The classes were well-attended, given the initial sample size for the study. In total, fourteen individuals attended the class sessions. The class offered a bootcamp approach to content strategy that included guidance in each of the identified areas of need (i.e., development of overall strategy, identifying audiences, tailoring messaging, and integrating strategy across tools and audiences). At the end of each class session, we asked participants if they enjoyed the session and would attend a future session on a related topic. Participants said they would. When asked what future trainings they would be interested in, participants overwhelmingly requested tool-specific trainings, such as how to effectively utilize specific social media platforms (i.e., Facebook, Twitter, LinkedIn, etc.) and specific digital marketing tools (i.e., MailChimp, Google Ads, etc.).

As a secondary intervention, Guisepppe has also developed several ongoing service-learning classes that continue to introduce non-profits partners to content strategy best practices, to develop content and planning materials with them, and to encourage additional learning. We have also conducted several more rounds of classes and distributed our free handbook broadly. As several years have passed since the original study, we can report that many of these interventions have been successful, at least anecdotally. We have collected data along the way to attempt to ascertain the effects of these interventions on individual organizations but have had difficulty bounding this follow-up study. It is one thing to invite 20 people to focus groups to discuss what they're currently doing. As we've learned, it is quite another to attempt to track the individual content strategies of dozens of local organizations.

Currently we have settled on a case study model in which we will discuss how two or three organizations adapted the knowledge we introduced them to (or failed to do so). Regardless, it is clear, at least from the overwhelmingly positive response of participants to these various interventions, that technical communicators wishing to assist non-profits with their content strategies can use similar techniques in their own communities. Whatever form they take, whether teaching a workshop, developing instructional materials, or doing free or low-cost consulting, such interventions should:

- introduce participants to content strategy best practices that are explained in a way that people without knowledge of this field can employ them;
- provide participants with written worksheets, PowerPoints, or other deliverables that they can take away with them; and
- be presented at a reduced rate or for free.

Readers of this article who are interested in doing this kind of work are encouraged to download the original handbook we developed, which we have made available for free: <https://www.contentgarden.org/non-profit-digital-marketing-handbook/>. To date it has been downloaded by dozens of academics and non-profit managers from around the world. Next, we conclude with a discussion of the limitations of our study and what the future holds for research on non-profit content strategy.

LIMITATIONS AND CONCLUSION

Non-Profits Clearly Need Content Help, But We Need More Data

Based on our own research, as well as past research into non-profit content strategy, it seems clear that non-profits need help developing effective workflows in this area. At the same time, one important limitation of research in this area is its relative scarcity. There is so little empirical research on non-profit content strategy that it is difficult to draw broader conclusions. It is possible that participants who have responded to the calls of existing studies were the ones most in need. It is possible that there is a whole other group of non-profits out there that are doing just fine with content strategy. One has only to compare the websites of large, national non-profits like the American Red Cross (<https://www.redcross.org/>) or the Ronald McDonald House (<https://www.rmhc.org/>) to the websites of local, regional, and thus much less well-funded, non-profits to see great disparities in content design, strategy, and reach.

At the same time, research on non-profit content strategy has not controlled for this variable: how well-funded an organization is. It seems future research in this area should attempt to compare less established non-profits with more established organizations to see if there is an effect on content strategy. It stands to reason that more established non-profits could afford to recruit better trained staff and to hire outside consultants when necessary. In our follow-up case study, we plan to compare several organizations, some of which have been around for decades and some of which were established only a few years ago. Such research could tell us much about the relationship between financial resources and content strategy. However, that research would need to account for anecdotal evidence from corporate practitioners who report that being well-funded does not automatically equal having an effective content strategy. Were that true, there would be no demand for content strategy consultants, yet, to the contrary, the need for them seems to grow more and more each year.

Despite these limitations, we believe our findings are generalizable to some degree as they match the findings of previous studies, many of which used broader recruitment methods. In addition, much of the literature we cited above on non-profit content strategy supports our findings, mainly that non-profits tend to struggle with developing consistent, effective strategies.

As we mentioned above, there are also many in the field of technical communication and related fields that we have personally spoken to who actively work with local non-profits to help them improve their content strategy. We challenge these individuals to contribute more research on this area while they are doing this important service work. Those who wish to mix service with research can find a welcome methodology in PAR as it was developed to facilitate just such a mix of data collection, analysis, and active intervention.

As to the question that leads this article, the question as to what technical communicators can do for non-profits, we hope we have contributed several activities our profession can engage in to assist these organizations. We will sum up these suggestions with a simple mantra we have used over the years to help us concretize our ongoing work in this area: *get involved, collect data, analyze, act, repeat*. Non-profits warmly welcome anyone willing to provide them with useful service, especially if that service fills a gap that they can readily identify in their organizational strategy. The best thing communication-oriented professionals can do is collaborate with local organizations that represent causes they support. Giving money is valuable, of course, and these organizations will not continue to exist without funding. However, giving the gift of knowledge is perhaps even more impactful as it increases organizational capacities, allowing non-profits to become more self-reliant, and thus more successful in the future.

REFERENCES

- Abel, S., & Bailie, R. A. (2014). *The language of content strategy*. XML Press.
- Albers, M. (2003). Multidimensional audience analysis for dynamic information. *Journal of Technical Writing and Communication*, 33(3), 263–279.
- Alexander, J., Nank, R., & Stivers, C. (1999). Implications of welfare reform: Do nonprofit survival strategies threaten civil society? *Nonprofit and Voluntary Sector Quarterly*, 28, 452–475.
- Ames, A. (Ed.). (2019). *Intercom*, 66(2).
- Andersen, R., & Batova, T. (2015). Introduction to the special issue: Content management—Perspectives from the trenches. *IEEE Transactions on Professional Communication*, 58(3), 242–246.

Helping Content Strategy

- Atherton, M., & Hane, C. (2018). *Designing connected content: Plan and model digital products for today and tomorrow*. New Riders.
- Bailie, R. A. (2013). A methodology for content strategy. *Intercom*, 60(5), 11–13.
- Bailie, R. A. (Ed.). (2019). Bringing clarity to content strategy. [Special issue]. *Technical Communication*, 66(2).
- Batova, T., & Andersen, R. (Eds.). (2015). *Transactions on Professional Communication*, 58(3), 241–347.
- Batova, T., & Andersen, R. (2016a). Introduction to the special issue: Content strategy—A unifying vision. *IEEE Transactions on Professional Communication*, 59(1), 2–6.
- Batova, T., & Andersen, R. (Eds.). (2016b). *Transactions on Professional Communication*, 59(1), 1–67.
- Bloomstein, M. (2012). *Content strategy at work: Real-world stories to strengthen every interactive project*. Morgan Kaufmann.
- Blythe, S., Grabill, J., & Riley, K. (2008). Action research and wicked environmental problems: Exploring appropriate roles for researchers in professional communication. *Journal of Business and Technical Communication*, 22(3), 272–298.
- Boettger, R. K., & Palmer, L. A. (2010). Quantitative content analysis: Its use in technical communication. *IEEE Transactions on Professional Communication*, 53(4), 346–357.
- Bridgeford, T. (Ed.). (2020). *Teaching content management in technical and professional communication*. Routledge.
- Brydon-Miller, M., Greenwood, D., & Maguire, P. (2003). Why action research? *Action Research*, 1(1), 9–28.
- Bureau of Labor Statistics. (2021, February 19). Technical writers. *Occupational Outlook Handbook*. U.S. Department of Labor. <https://bls.gov/ooh/media-and-communication/technical-writers.htm>
- Caldwell, J. (2020, February 11). *What storytelling means to voice and tone strategy*. The Content Wrangler. <https://thecontentwrangler.com/2020/02/11/what-storytelling-means-to-voice-and-tone-strategy/>
- Casey, M. (2015). *The content strategy toolkit: Methods, guidelines, and templates for getting content right*. New Riders.
- Clark, D. (2016). Content strategy: An integrative literature. *IEEE*, 59(1), 7–23.
- Content Marketing Institute. (2016). *2016 nonprofit content marketing: Benchmarks, budgets, and trends—North America*. CMI. http://contentmarketinginstitute.com/wp-content/uploads/2015/11/2016_NonProfit_Research_FINAL.pdf
- Crabtree, R., & Sapp, D. (2004). Technical communication, participatory action research, and global civic engagement: A teaching, research, and social action collaboration in Kenya. *Reflections*, 4(2), 9–33.
- Dush, L. (2014). Building the capacity of organizations for rhetorical action with new media: An approach to service learning. *Computers and Composition*, 34(2014), 11–22.
- Eady, S., Drew, V., & Smith, A. (2015). Doing action research in organizations: Using communicative spaces to facilitate (transformative) professional learning. *Action Research*, 13(2), 105–122. <https://doi.org/10.1177/1476750314549078>
- Flanagan, S., & Getto, G. (2017). Helping content: A three-part approach to content strategy with nonprofits. *Communication Design Quarterly*, 5(1), 57–70.
- Getto, G. (2017). Helping communication: What nonprofits need from content strategists. *Proceedings of the 35th ACM International Conference on Design of Communication*, 8, 1–9.
- Getto, G., Labriola, J. T., & Ruskiewicz, S. (Eds.). (2019). *Content strategy in technical communication*. Routledge.
- Gonzalez, L., & Turner, H. N. (2017). Converging fields, expanding outcomes: Technical communication, translation, and design at a non-profit organization. *Technical Communication*, 64(2), 126–140. <https://ingentaconnect.com/content/stc/tc/2017/00000064/00000002/art00005>
- Grabill, J. (2004). Technical writing, service learning, and a rearticulation of research, teaching, and service. In T. Bridgeford, K. S. Kitalong, & D. Selfe (Eds.), *Innovative approaches to teaching technical communication* (pp. 81–92). Utah State University Press.
- Grabill, J. (2007). *Writing community change: Designing technologies for citizen action*. Hampton Press.

- Halvorson, K. (2008, December 16). The discipline of content strategy. *A List Apart*. <https://alistapart.com/article/thedisciplineofcontentstrategy/>
- Halvorson, K., & Rach, M. (2012). *Content strategy for the web* (2nd ed.). New Riders.
- Hart-Davidson, W., Bernhardt, G., McLeod, M., Rife, M., & Grabill, J. T. (2008). Coming to content management: Inventing infrastructure for organizational knowledge work. *Technical Communication Quarterly*, 17(1), 10–34. <https://doi.org/10.1080/10572250701588608>
- Henning, T., & Bemer, A. (2016). Reconsidering power and legitimacy in technical communication: A case for enlarging the definition of technical communicator. *Journal of Technical Writing and Communication*, 46(3), 311–341. <https://doi.org/10.1177/0047281616639484>
- Kenix, L. (2008). Nonprofit organizations' perceptions and uses of the internet. *Television & New Media*, 9(5), 407–428.
- Klein, S. M. (1996). A management communication strategy for change. *Journal of Organizational Change Management*, 9(2), 32–46. <https://doi.org/10.1108/09534819610113720>
- Kohut, G. F., & Segars, A. H. (1992). The president's letter to stockholders: An examination of corporate communication strategy. *International Journal of Business Communication*, 29(1), 7–21. <https://doi.org/10.1177/002194369202900101>
- Krippendorff, K. (2019). *Content analysis: An introduction to its methodology* (4th ed.). Sage.
- Lauth, I. (2014). Nine essentials of highly effective nonprofit content marketing [blog post]. <http://bit.ly/1mMz2Li>
- Littlemore, J. (2003). The communicative effectiveness of different types of communication strategy. *System*, 31(3), 331–347. [https://doi.org/10.1016/S0346-251X\(03\)00046-0](https://doi.org/10.1016/S0346-251X(03)00046-0)
- Mara, A., & Mara, M. (2015). Capturing social value in UX projects. *Proceedings of the 33rd ACM International Conference on Design of Communication*, 23.
- Morgan, K. J., & Campbell, A. L. (2011). *The delegated welfare state: Medicare, markets, and the governance of social policy*. Oxford University Press.
- Nafi, J. (2019, March 1). Top 5 non-profit organizations providing free medical care to people in need. *Transparent Hands*. <https://transparenthands.org/top-5-non-profit-organizations-providing-free-medical-care-to-people-in-need/>
- National Council of Non-Profits. (2020). Myths about nonprofits. Council of Nonprofits. <https://councilofnonprofits.org/myths-about-nonprofits>
- Neuendorf, K. A. (2017). *The content analysis guidebook* (2nd ed.). Sage.
- Nichols, K. (2015). *Enterprise content strategy: A project guide*. XML Press.
- Pennerstorfer, A., & Neumayr, M. (2017). Examining the association of welfare state expenditure, non-profit regimes, and charitable giving. *International Society for Third-Sector Research*, 28(2017), 532–555. <https://doi.org/10.1007/s11266-016-9739-7>
- Pope, J. A., Isely, E. S., & Asamao-Tutu, F. (2009). Developing a marketing strategy for nonprofit organizations: An exploratory study. *Journal of Nonprofit and Public Sector Marketing*, 21(2), 184–201. <https://doi.org/10.1080/10495140802529532>
- Porter, A. (Ed.). (2013). Content strategy [Special issue]. *Intercom*, 60(5).
- Pullman, G., & Gu, B. (Eds.). (2008). *Technical Communication Quarterly*, 17(1), 1–148.
- Rockley, A., & Cooper, C. (2012). *Managing enterprise content: A unified content strategy* (2nd ed.). New Riders.
- Rockley, A., Cooper, C., & Abel, S. (2015). *Intelligent content: A primer*. XML Press.
- Saunders, C. (Ed.). (2019). Content engineering [Special issue]. *Intercom*, 66(7).
- Small, S., & Uttal, L. (2005). Action-oriented research: Strategies for engaged scholarship. *Journal of Marriage and Family*, 67(4), 936–948.
- Society for Technical Communication. (2021). Defining technical communication. <https://stc.org/about-stc/defining-technical-communication/>
- Somekh, B. (2006). *Action research: A methodology for change and development*. Open University Press.
- Stewart, D., & Shamdasani, P. (2015). *Focus group: Theory and practice*. Sage.
- Sullivan, D. L. (1990). Political-ethical implications of defining technical communication as a practice. *Journal of Advanced Composition*, 10(2), 375–386. <https://jstor.org/stable/20865737>
- Wachter-Boettcher, S. (2012). *Content everywhere: Strategy and structure for future-ready content*. Rosenfeld Media.

Helping Content Strategy

Walwelma, J., Sarat-St. Peter, H., & Chong, F., (Eds.). (2019). *IEEE Transactions on Professional Communication*, 62(4), 315–407.

Zorn, T., Flanagan, A., & Shoham, M. (2010). Institutional and noninstitutional influences on information and communication technology adoption and use among nonprofit organizations. *Human Communication Research*, 37(1), 1–33.

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APPENDIX A: FOCUS GROUP SCRIPT

- How Your Organization Communicates
 - Who are the people in the community that you are trying to reach through your organization?
 - What are all the ways you communicate with these audiences?
 - Which of these ways of communicating do you find to be the most effective, and why?
 - Which of these ways of communicating do you find to be the least effective, and why?
- Organizational Websites
 - How many of you have websites for your organizations?
 - If you have one, what do you most like about your organization's website?
 - What do you most dislike about it?
 - If you don't have a website for your organization, why is that?
 - Who are the people you are trying to reach with your organization's website?
 - What feedback have you gotten, if any, from visitors to your organization's website?
 - What would you like your organization's website to do for your organization and for the people you are trying to reach?
- Social Media
 - How many of you use social media as an organization?
 - What social media platforms do you use (i.e., Twitter, Facebook, LinkedIn, etc.)?
 - What do you most like about your organization's social media?
 - What do you most dislike about it?
 - If you don't use social media as an organization, why is that?
 - Who are the primary audiences for your organization's social media?
 - What feedback have you gotten, if any, from audiences you interact with on social media?
 - What would you like social media to do for your organization?
- Goals For This Research Study
 - What made you sign up for this research study? What do you hope to get out of participating?
 - What unmet service or programmatic needs do you have that you think might be met through the use of online media?
 - How do you plan to meet those needs?
 - What kinds of educational opportunities would you be most interested in participating in as part of this study? What do you most hope to learn through this study?

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APPENDIX B: DIGITAL MARKETING HANDBOOK



Snowpocalypse 2021: Understanding Stakeholder *Topoi* in the 2021 Texas Power Grid Failure

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By Rachel Martin Harlow

ABSTRACT

Purpose: This research is the first step in exploring how public policymakers use the expert knowledge and nonexpert knowledge they acquire in oversight hearings. This step is focused on learning *what the testimony in oversight hearings reveals about how the primary stakeholders of the February 2021 power loss event understood that event.*

Method: The researcher used NVivo, a content analysis application, to examine public comments, witness testimony, and a combination of legislators' press releases and the text of bills they drafted. All texts were generated in February and March 2021. The researcher ran both a word frequency analysis and a thematic analysis of each set of texts to identify *topoi* used by each stakeholder group and compared the results.

Results: The analysis revealed that the three primary stakeholder groups perceived the February 2021 power loss event differently, though some of the most salient, significant, or urgent concerns of each group overlapped. The stakeholder groups shared some *topoi*, but the ways each group used those *topoi* suggested different ways of understanding and interpreting the event.

Conclusions: Technical communicators who are tasked with reconciling technical and nontechnical audiences in situations like this can use the techniques discussed here to better identify specific places where the respective groups' use of *topoi* diverged from one another or aligned with one another. The more that is known, and not just surmised, about stakeholders and how they understand and interpret their technical knowledge, the better we can address how that knowledge may be communicated throughout the legislative process.

KEYWORDS: content analysis, public policy, *topoi*, expert knowledge, nonexpert knowledge

Practitioner's Takeaway

- Technical communicators who work in public affairs or public policy are often called to reconcile public knowledge with diverse areas of technical expertise.
- Multiple stakeholders may use the same *topoi* but understand and interpret those *topoi* differently.
- Automated content analysis of large sets of textual data can use *topoi* to identify areas of overlap and difference in how stakeholders interpret public policy communication.

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INTRODUCTION

In early February 2021, all of Texas was watching the weather. The National Weather Service predicted the advance of Winter Storm Uri, a frigid air mass that was expected to linger over the state for days, bringing below-zero temperatures, freezing rain, and heavy snow to a state unaccustomed to severe winter conditions. Among the many state agencies warning citizens of the impending storm were the Public Utility Commission of Texas and the Electric Reliability Council of Texas (ERCOT), a non-profit entity that “works with those utility providers to manage the flow of power to about 90% of the state” (Menchaca, 2021). Officials at these agencies expected “demand for electricity . . . to hover just below the record demand typically seen in the summer,” though many of the state’s available generators and power plants were offline because of lower winter demand (Menchaca & Ferman, 2021).

The storm was worse than expected. Governor Greg Abbott issued a disaster declaration on February 12 and deployed state resources to protect life and property, while ERCOT and the Public Utility Commission made increasingly urgent calls for Texans to conserve energy as much as possible (Public Utility Commission of Texas, 2021). The U.S. Energy Information Administration (2021) reported net electricity generation on the Texas power grid:

Fell below ERCOT’s day-ahead forecast demand shortly after midnight on February 15, and that trend persisted through February 18. The mismatch between demand and day-ahead forecast demand quickly grew to at least 30,000 megawatts (MW) on February 15 before eventually narrowing to slightly less than 20,000 MW by February 17 (February 19).

For over a week much of Texas was shut down and shivering in the cold and dark. The *Texas Tribune* predicted short-term rolling blackouts following ERCOT’s emergency plans; the actual blackouts ranged from a few minutes to days, depending on the capacity of individual electricity providers, and the cold and blackouts caused water supply and quality problems. One could hardly blame Texans for dubbing the event “Snowpocalypse” and “Snowmageddon,” for “many people lacked internet access, cellphone service and the ability to watch the governor’s press conferences. When

the power went out, the state suddenly lost the ability to provide essential information to people desperately in need of help” (Agnew, 2021). The crisis was acute, both in its severity and its duration, for by February 19, ERCOT lifted emergency conditions. As far as power generation and transmission were concerned, the crisis had passed.

The reckoning, however, was swift in coming. Within a week the governor and key committees of the Texas Legislature called for investigative hearings to determine the cause of failures mechanical and administrative. In the Texas House of Representatives, the Committees on Energy Resources and State Affairs called representatives from ERCOT, from the Public Utility Commission of Texas, from public-private councils and lobbying groups, and from power generation and transmission entities all over Texas to testify at a joint public hearing on February 25 “to consider the factors that led to statewide electrical blackouts during the recent unprecedented weather event; the response by industry, suppliers, and grid operators; and changes necessary to avoid future power interruptions” (Paddie, 2021). That hearing recessed well past midnight and was concluded on February 26. At the same time, the Texas Senate Committee on Business and Commerce held its own public hearing, the purpose of which was more narrowly focused on examining “extreme weather condition preparedness and circumstances that led to the power outages as directed by Electric Reliability Council of Texas (ERCOT).” The committee also intended to “review generator preparedness and performance, utility outage practices, natural gas supply, and the reliability of renewable generation, as well as overall ERCOT system resilience” (Hancock, 2011). A second Senate hearing, later canceled, was scheduled for March 4 by the Committee on Jurisprudence to:

Examine the legal responsibilities that the Electric Reliability Council of Texas (ERCOT) and the Public Utility Commission of Texas (PUC) owe to the people of Texas. The committee will review the legal framework for governance and oversight of these two entities, their relationship to one another under the law, potential legal liabilities, and the legal limits on increases to consumer electricity rates during an emergency. The committee will also examine price gouging under the Texas Deceptive Trade Practices-Consumer Protection Act and

receive an update from the judiciary on how the judicial system is managing its operations during the ongoing statewide emergency. (Legislative Reference Library of Texas, 2021)

In the weeks following the hearings, the three commissioners of the Texas Public Utility Commission resigned. Dozens of bills were drafted and introduced in the Texas Legislature; as of the end of the regular session, 10 bills relating to electricity regulation had been engrossed, or advanced from one legislative chamber to the other for consideration. Thus, the effects of the February 2021 power loss event following winter storm Uri continued to ripple through state politics as the Legislature moved to the end of its regular session. This unfolding situation provided an opportunity to explore what public policymakers do with the information they acquire in oversight hearings. Such information is a combination of expert knowledge and nonexpert knowledge, any of which may contribute to the “envisioning and redirecting” of public policy (Rude, 1997, p. 78) in the midst of a response to an ongoing crisis.

Technical communicators who work in industries subject to public oversight, such as the commercial power industry, must negotiate complex audiences composed of legislators, industry experts, and the public—stakeholder groups whose interests may both conflict and converge. Stakeholder groups like these consist of people who share a common interest, or stake, in an issue and who share information about that issue. Three primary stakeholder groups emerged in the hearings following the Texas power loss event of February 2021: the public, legislators, and industry witnesses who testified at the hearings. The present study thus focuses on addressing the following question: *What do variations in topoi used in the testimony in oversight hearings reveal about how the primary stakeholders of the February 2021 power loss event understood that event?*

Over time, stakeholder groups develop patterns of language and reasoning, or what rhetoricians call *topoi*, that include words used or defined in specific ways; figures of speech, recognizable stories, and familiar analogies, all of which serve as shortcuts or heuristics for more fully developed arguments and positions. While some *topoi* are unique to a specific group of stakeholders, others may be held in common with other stakeholder groups (Ross, 2013). Moreover, some

topoi may appear to be shared by different stakeholder groups, but actually represent very different ways of understanding the issue (Bormann, 1985). While these groups may use the same language to express their respective interests, it is important for technical communicators to understand the nuances of the way each group understands and interprets that language.

TESTIMONY IN OVERSIGHT INVESTIGATIONS: A REVIEW OF THE LITERATURE

Public policy is a technical or specialized field that produces information, processes that information into knowledge, and uses that knowledge to inform practice (Williams, 2009). Its complexity is compounded by the fact that it is concerned with a wide variety of other technical and specialized fields, from finance to medicine to civil infrastructure. Following a crisis, researchers often examine how technical communication is used in oversight investigations, both those that seek to determine the underlying cause(s) of the crisis and policy changes that might be undertaken to resolve it. Winsor (1988) and Moore (1992) explored the relationship between organizational communication practices with respect to technical information within public testimony. Shaffer (2017) used the transcripts of an oversight hearing to explore how cognitive load affects individual legislators. Numerous scholars, including Youngblood (2012), Dragga and Gong (2014), Lancaster (2018), and Lundgren and McMakin (2018) have explored the communication of risk around such events. The overwhelming focus of post-crisis communication seems to be on organizations' public relations efforts (Arendt, LaFleche, & Limperopulos, 2017), particularly image repair and reputation management efforts directed toward the larger public (Benoit, 1995; Coombs, 2004; Coombs & Holladay, 2002; Drumheller & Kinsky, 2021; Ma & Zhan, 2016). In recent years increasing interest has turned to the role of social media in such efforts (Austin, Liu, & Jin, 2012; Wendling, Radisch, & Jacobzone, 2013).

In the context of public policy, technical communicators must do more than simply translate expert knowledge to non-experts; rather, they must reconcile specialized and common knowledge, or find some agreement between what experts say and

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what lay audiences in the public think. Some research in the differences between expert knowledge and nonexpert knowledge has been done (Boswell, 2009; Carlton & Jacobson, 2016; Christensen, 2021; Coles & Quintero-Angel, 2018; Lundin & Öberg, 2014), but more is needed, particularly in the degree to which policymakers incorporate both into the legislation they write. This need is most clearly demonstrated in public hearings, wherein legislatures call upon both experts and the public to testify. In the U.S., many legislative bodies, including Congress and state legislatures, are authorized to conduct such hearings. Frulla (2012) explains that such hearings fall into two classes: legislative investigations, in which experts and members of the public are called upon to inform the development of public policy, and oversight investigations, which are held to review how the legislative body's laws are carried out or to hold major corporations or other entities accountable for their actions in and responses to a major crisis (p. 375).

Research on legislative and congressional testimony thus far has considered primarily legislative investigations (Chapman, 2020; Evans & Narasimhan, 2020; Marvel & McGrath, 2016), and research in technical communication has argued that the collected weight of such testimony actually does influence legislators' decision-making (Rude, 2004), particularly when it includes data and information presented by individuals whose credibility derives from knowledge or expertise (Moreland-Russell et al., 2015, p. 95). In legislative hearings, reports and other forms of testimony may have quiet but far-reaching effects in the organizational construction of knowledge, as the language they use reflects a specific way of perceiving, reasoning about, and understanding an issue, that, if adopted by lawmakers, may ultimately influence how the public perceives, reasons about, and understands that issue.

Oversight investigations are a type of legislative hearing, generally called in response to a crisis or other exigence, in which the reconciliation of technical and public knowledge is especially urgent. Oversight investigations "tend to be more confrontational, intrusive, and fraught with risk exposure (reputational, regulatory, criminal, economic)" than legislative investigations (Frulla, 2012, p. 374). Moreover, such investigations are performed or enacted in a complex rhetorical space that is both "institutionally

complex (i.e., procedurally dense) and technically and scientifically complex" (Simmons & Grabill, 2007, p. 423), and yet open to the public. Legislators use this space to enter into public record highly technical testimony that also must be relatively accessible to a complex audience of experts, informed non-experts, and uninformed non-experts. The testimony may be delivered in a variety of forms or media, as Rude (2004) suggests, and whether the testimony is delivered as a formal report, oral statement, response to questioning, or prepared visual, it is "a tool of strategic action," and an "active address to a complex audience that does not reside in one place at one time" (p. 283). This audience includes not only the legislators holding the hearing, who must be persuaded "of the merits of the argument" offered as testimony, but also members of the press and of the broader public who might act on this information well into the future (p. 283).

METHOD

Contemporary oversight investigations generate a staggering amount of text, audio, and video, and while each individual item entered into the record may be of limited significance, it is the combined weight of these items that affects public policy (Rude, 2004). A substantial and growing body of research has been focused on analyzing large data sets through content analysis and text mining methods (Frith, 2017; Graham, 2015; Lam, 2016). In *quantitative content analysis* statistical methods are applied to textual data to identify relationships between ideas, meanings, and the context of a corpus of data (Riffe et al., 2019, p. 23), while *qualitative content analysis* and *thematic analysis* explore meaning as it is embedded and expressed in the data. Both forms of content analysis are time-consuming when done by hand on even small data sets; for large data sets these methods become highly problematic. However, researchers can now use robust text mining software that does content analysis using sophisticated algorithms to analyze unstructured text (Allahyari et al., 2017), as well as video, audio, and multimedia sources (Karaa & Dey, 2017).

The current study used NVivo, a text mining and content analysis application, to analyze the 2021 power loss event hearings using both frequency analysis (quantitative) and thematic analysis (qualitative). Frequency analysis relies on the assumption that the

more often a word or a family of related words appears in discourse, the more important that word or family of words is to those who use it. In contrast, thematic analysis looks not only for conceptual relationships between individual words but also among ideas, phrases, and figurative language (Vaismoradi & Snelgrove, 2019). The mixed-methods approach is useful in determining not only the words associated with specific *topoi* but also the concepts, figurative language, and logic associated with them.

To complete the frequency analysis, the researcher ran a word frequency query that counted the frequency of words of 3 or more letters and that grouped exact matches, stemmed words, synonyms, and specializations. This word frequency query was cast with intentionally broad parameters, as rhetors tend to use *topoi* as shortcuts or heuristics for more fully developed arguments and positions, assuming that others will interpret those *topoi* just as they do.

Because an automated frequency analysis may miss implicit associations between ideas, concepts, and experiences that may be unique to each stakeholder group, the researcher also conducted an automated thematic analysis of the texts associated with the three stakeholder groups involved in the oversight hearings. This thematic analysis identifies noun phrases and sentence-level patterns of repetition associated with those noun phrases. The application weighed relative significance of each theme in each item and across all the items in the analyzed set, then grouped the themes into broader categories of ideas.

The researcher then compared the 20 most frequently used word families from the frequency analyses and the 20 most prominent themes from the thematic analyses for each stakeholder group to understand how each stakeholder group viewed the power crisis event. The third stage of the analysis involved comparing the most important themes, as measured by the frequency with which they appeared in the records, across all three stakeholder groups. This comparative analysis can reveal not only points at which “different interpretive communities focus cognitively and rationally on different elements of a policy issue . . . because they value different elements differently,” but also differences in how the respective groups’ values “conten[d] for public recognition and validation” (Yanow, 2000, p. 11).

Data Sets

On February 25 and 26, 22 witnesses were called to testify before a joint session of the 11 members of House Committee on Energy Resources and the 13 members of the House Committee on State Affairs, a process that produced over 25 hours of oral testimony, both in person and virtual. Also, on February 25 and 26, 26 witnesses were called to testify before the Senate Committee on Business & Commerce. This hearing, independent of the House Committee hearing, produced over 23 hours of oral testimony. Both hearings were broadcast live. Many of those witnesses also submitted written testimony for the public record. Because of public health restrictions implemented as a result of the COVID-19 pandemic, only individuals invited to provide testimony were permitted to attend the hearings, and public comment was sought through a written medium, rather than oral testimony.

The current study classified data drawn from these hearings into three sets: public comment, legislator, and witness. All the documents examined in the current study were created in February and March 2021, though the timing of the three data sets varied slightly. For example, public comment in the Texas House was open before, during, and after the oral portion of the hearings, while most of the legislation was proposed in the month following the hearings. In addition, the data sets varied in size and composition; the text of bills, for instance, is highly technical and specialized, while the public comments include a mix of expert and non-expert communications, some formal, some informal.

Public comment data set

Public comments for the Senate were collected through an e-mail form on the Texas Senate’s web site but are thus far unpublished. Public comments from the House public comment database were entered into the House record as testimony on March 1, at which point well over 8,000 comments were recorded. Current research, including studies by Bogain (2020), Cheng and Jin (2019), Gallagher (2020), George and Hovey (2020); Kalogeropoulos et al. (2017), Muddiman and Stroud (2017), and Taylor et al. (2016), have explored the content of online posts to comment boards as a useful source of information about the attitudes, opinions, and experiences of members of the public, despite real concerns about how well such comments represent the full range of public experience. The Texas Legislature’s

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two public comment access points are and have been accessible to the public for years and were shared with the public by means of notices of public hearing that were picked up by local news outlets as early as February 22. In the public notice of the committee hearings, the House set the deadline for public comment at noon on March 1, 2021.

Legislator data set

The concerns of legislators were explored through two types of documents: press releases and the language of proposed legislation. Because these two genre differ significantly in scope, audience, and purpose, they were analyzed separately.

Press releases “play a significant role in the production and framing of news,” and as such are important because they function as “information subsidies,” or a means by which practitioners interpret the information provided to journalists through selection, emphasis, and omission of certain attributes out of all that is available about an issue or event (Lee & Basnyat, 2013, p. 122). Thus, press releases can be used to represent how legislators would prefer the public to interpret a given issue or situation. Between February 17, 2021 and the end of the regular legislative session on March 30, 2021, various members of the Texas House of Representatives and the Texas Senate published press releases related to the Texas electricity industry, regulators, and related legislation on the web sites of the House and the Senate.

Press releases are not the only means by which legislators leave a record of their specific concerns related to an issue. Of the 7,548 bills filed in the 87th Legislature Regular Session by the March 12 deadline, over 400 related to energy, electricity, or public utilities, and 277 were related to the 2021 power event.¹ The language used in these bills reflects not only the legislative and legal positions of their authors, but also how the writers of each proposed bill understood and interpreted the February power event, both in terms of the justification offered at the beginning of each bill and in terms of the legal response

they considered appropriate and acceptable to their constituents. It is far from uncommon for legislators to file multiple bills that propose action on a single issue, knowing that the redundancies and conflicts will be resolved in committee. Those who study public policy as a technical or specialized field recognize that the initial filing of a bill is a complex form of technical communication that must conform to very specific requirements of format, language, process, and technical detail, but also serves as a medium of communication between a legislator and their constituency in which the legislator may acknowledge or address the way they believe their constituents interpret a specific problem.

Witnesses data set

To fully understand how the three primary stakeholder groups understood and interpreted the February 2021 power events, the testimony of the witnesses cannot be ignored. The 26 witnesses who were invited to testify before the joint hearing of the House Committees on Energy Resources and State Affairs and before the hearing of the Senate Committee on Business and Commerce represented a variety of stakeholders, including industry interest groups and lobbying organizations, for-profit power generation and distribution companies, electric cooperatives and municipal utilities, regulatory agencies and public-private coalitions, hydrocarbon producers and distributors, renewable energy producers and distributors, a telecommunications company, and the not-for-profit electrical grid operator.

Most of the data to be drawn from witness testimony is contained in over 23 hours of video recordings, transcripts for which have not yet been generated. However, many of the witnesses also submitted written testimony to the oversight hearings. Thus, the corpus of data analyzed in this study includes both the written testimony that was submitted to the House Committees and published online and the summary of testimony included in the *Senate Committee on Business & Commerce Interim Report to the 87th Legislature* (2021). On the Senate side,

1 In Texas, most bills are submitted to either the House or the Senate. A bill that survives committee review and floor deliberation in the original chamber to which it was submitted is referred to the other chamber, where it undergoes the same process of committee review and, if the committee regards it favorably, to floor deliberation. If the bill survives that, it is returned to the originating chamber, which reviews the second chamber's amendments, if any. If the originating chamber concurs with the amendments, the bill is approved by both chambers and sent to the governor. Some bills, however, are cosponsored by members of both chambers. Cosponsored bills have identical text but are submitted to both legislative chambers concurrently and are treated as separate bills (Texas Legislative Council, 2018).

the summary of oral testimony was written by the committee; while the actual documents submitted as written testimony have not been published, it is likely that the documents submitted by those witnesses who testified before both the House and the Senate hearings were similar or identical to one another. On the House side, no summary of oral testimony is available and not every witness submitted written testimony; however, the documents that were submitted have been published and are available to the public. Consequently, this corpus constitutes a much smaller and less uniform data set than those of the other stakeholder groups. Future research will be able to strengthen this corpus with data from oral testimony.

ANALYSIS AND DISCUSSION

Frequency Analysis

The results of the frequency analysis are summarized in the table below, which identifies the 20-word families that appeared with the highest frequency in each data set. The word families noted in Table 1 are categories, rather than individual words. The *event* word family, for example, groups *words that characterize or are related to events* together under one label. The table shows not only the actual number of items counted within each word family but also the word family's weighted percentage, which compares the frequency of the word against the total number of words counted. This weighted percentage accounts for similar words that may be coded as part of more than one word family.

Table 1. Most Frequently Appearing Word Families in Each Stakeholder Group Data Set

Rank	Public Comment			Witness Written Testimony			Bills & Legislators' Press Releases		
	Word	Count	Weighted %	Word	Count	Weighted %	Word	Count	Weighted %
1	Texas	9,785	1.11	2021	709	1.95	provider	5,806	1.18
2	blackouts	5,358	0.55	relating	965	1.75	activities	13,213	1.05
3	without	4,709	0.53	introduced	482	1.14	acts	13,592	1.04
4	power	32,038	0.49	event	3,145	0.95	electric	3,303	1.03
5	ERCOT	4,061	0.46	acting	3,571	0.92	organization	11,470	1.02
6	Texans	3,950	0.45	state	1,461	0.90	utility	4,831	1.02
7	period	18,233	0.42	units	2,606	0.85	period	4,159	0.97
8	week	3,108	0.35	author	1,706	0.84	changes	10,916	0.90
9	statewide	3,003	0.34	supply	1,805	0.82	united	9,998	0.89
10	event	34,824	0.34	periods	1,268	0.82	state	5,259	0.84
11	days	11,259	0.33	activities	3,167	0.77	automobile	2,021	0.79
12	acting	42,763	0.32	changes	2,375	0.70	takes	5,350	0.79
13	conditions	25,171	0.31	content	2,020	0.68	months	2,120	0.70
14	change	39,134	0.30	make	1,777	0.67	event	7,945	0.65
15	state	32,930	0.28	organization	1,933	0.65	follows	1,240	0.60
16	conscious	7,448	0.28	communication	1,614	0.61	quality	7,660	0.58
17	never	2,420	0.27	Texas	405	0.60	operator	5,729	0.58
18	self	7,252	0.27	record	1,522	0.59	entity	3,016	0.57
19	electrical	9,004	0.27	referred	868	0.59	region	4,447	0.54
20	hours	6,153	0.26	ERCOT	212	0.58	occurrence	4,721	0.51

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Finding patterns of related words in a large sample of texts can reveal the *topoi* that are held, or at least recognized, by members of the group. Again, for the purposes of this study, the frequency of a *topos* functions as a proxy for its importance. A shortcut or heuristic only becomes a *topos* when it encapsulates a widely shared way of understanding the world. The most important, most useful, most shared *topoi*, then, should appear more often in the testimony.

Time *topoi*

In this study, time was an evident concern of all three stakeholder groups, though the ways in which they expressed time differed. The general term *period* appeared within the top 20 most frequently used words in the frequency analysis. In addition, the public articulated time concerns in units of immediacy (*week*, *days*, and *hours*), consistent with the acute nature of the power loss event. Legislators articulated time concerns in terms of *months*. Though the laws they negotiate are designed for extended use, Texas's biennial legislative sessions meet for five months out of every 24-month period, a cycle that may affect how legislators perceive time. In contrast, witnesses' specific references to time are largely about a single year, 2021. As the oversight hearings took place in February 2021, it is likely that the witness texts are either narrowly focused on the week of the power loss event or project actions into the remaining ten months of the year.

Entity *topoi*

Many of the most frequently used word families identified in the frequency analysis characterized or related to each stakeholder group's perception of *entities*, or groups of people bound by membership relationships. The legislator stakeholder group mentioned *entity* frequently, along with *provider*, *operator*, and *unity*. The witness and legislator stakeholder groups made frequent mention of *organization*, while the witness and public groups identified *ERCOT* (the Electric Reliability Council of Texas) as an entity—the witness texts specifically identified ERCOT 202 times, while the public texts did so 4,061 times. It is the only named entity in the 20 most frequently used word families of each of the three stakeholder groups. The grid operator was key to how the public and the witnesses perceived the power loss

event, and interestingly, the frequency with which the public named ERCOT suggests that the word served not only to identify a specific government agency. A brief examination of both the witness testimony and the public comments suggests an intriguing distinction in the way these two stakeholder groups use the term *ERCOT*. While the witnesses use the term to refer specifically to the Energy Reliability Council of Texas, the public seems to use *ERCOT* as a shorthand reference to the entire electricity industry and the state agencies that regulate it, a *topos* that depends on synecdoche (a figure of speech and writing in which a part represents the whole). This suggestion is beyond the scope of the current study, but it merits additional research.

Location and membership *topoi*

Closely related to the entity *topoi* are those in which location and membership were connected. Word families that characterize or are related to geography, such as *region* and *state*, were frequently used by all three stakeholder groups in reference to geographical jurisdictions.² Witnesses tended to use geographical terms literally, consistent with their interests in physical locations and areas, while the public and legislator stakeholder groups used some geographical terms figuratively. For example, *Texas* was often used as a metonymic reference to the people of Texas as well as to the political entity.

Event perception *topoi*

The frequency analysis also provides some insight into how each group perceived what happened during the week of February 14–21, 2021. The public stakeholder group used words that characterized or were related to *event*, *blackouts*, *statewide*, *conditions*, along with *hours*, *days*, and *week*. This group, it would seem, understood the power loss event as something a group experienced over a specific time. Witnesses used words in the *event* word family also, but the overall emphasis was on *supply*, *units*, and *activities*, indicating a more technical understanding of the power loss event. The word families most prominent in the legislator lists, such as *acts*, *occurrence*, *operator*, *event*, *provider*, and *organization* emphasized agents and actions. Given that the oversight hearings called forth agents to testify about those actions, these *topoi* suggest

2 The *state* word family also included references to utterances and to conditions. The weighted percentage value accounts for this overlap.

that the legislators perceived the events in terms of responsibility: who was responsible for normal electrical grid operations and who was responsible for the failures thereof.

Future research may find additional points of interest in this data set through *sentiment analysis*, a subset of text mining that focuses on identifying the valence, or emotional content, of unstructured text (Cambria et al., 2017). The most clearly negative word families in the frequency analysis are *blackouts*, *without*, and *never*, all of which appear in the public list. Neutral word families dominate both the witness group and the legislator group. The public, who suffered most from the power loss event, might be expected to perceive the event more personally and negatively than either of the other two.

Three word families generated by the content analysis application should be viewed with some circumspection: *self* in the public list, and *act* and *takes* in the legislator list. The *self* word family includes references to one's own person and experiences; it is also related to the *conscious* word family, which includes terms about self-reflection and ego and frequently is used to acknowledge the context of a complaint. However, *self* is also a term used on the House Public Comment form to denote on whose behalf the form is being submitted, so it appears with much more frequency than it would in natural language. This specific use may skew the results of the frequency analysis. Similarly, the term *act* has a specialized use in legislation, as every bill is introduced as "An Act to be Entitled" until it is given a name, and every bill begins with the language "Be it enacted." Though the word *act* itself was excluded from the frequency count and the application coded *acts* and *activities* separately, words related to *acts* or *acting* may yet be overrepresented in the legislative stakeholder data set. The *takes* word family is problematic for a different reason: the words coded as part of that family seem less related to one another than other word families. The word family breaks apart at a more restrictive level of analysis, which suggests that another round of more targeted coding may be needed to determine what, if any, insights the word family might offer.

Thematic Analysis

The results of the autocoded thematic analysis are summarized in Table 2. The content analysis application

used an iterative process to identify distinct themes or topics at the sentence level, rather than at the word level (as in the word frequency analysis). This analysis was not limited to a specified number of themes but lists all themes generated and the frequency with which they appeared in each data set.

The most noticeable difference between this analysis and the word frequency analysis is the format of the results. A total of 37 distinct themes emerged from the witness stakeholder group texts, while 15 emerged in the legislator group and only 13 emerged from the public group. A greater number of themes indicates that more distinct topics were addressed in the texts; fewer themes mean the texts were more focused on fewer ideas or concepts.

Unsurprisingly, most of the themes coded in the witness data set related to the generation, transmission, and delivery of electrical power. The diversity of themes among witnesses' written testimony indicates that the data set includes significant amounts of technical detail and that this stakeholder group distinguishes concepts in ways the other two groups might not. In addition to technical themes related to the generation and distribution of electricity (such as *load*, *capacity*, *generation*, *grid*, *distribution*, *outages*, and *nodes*), themes related to the business of electricity (*service*, *market*, *supply*, *demand*, *customers*, *companies*, *price*, *resources*, and *costs*) also emerge. The themes that emerged in the legislator data set tended to be less technical in nature and more aligned with the business of electricity, which is consistent with the role the Legislature has taken toward regulating the electricity industry in Texas (Price, 2021). In contrast, themes that were most strong in the public stakeholder group were related to personal experiences caused by the power loss event: *weather*, *winter*, and *cold*. The themes highlight the interrelated nature of public utilities, as well since the loss of *power* or *electricity* led to *blackouts* and problems with electricity-dependent *water* and *gas* utilities.

There was less overlap between coded themes than between word families in the frequency analysis. Only four themes, *electric(al)*, *generation*, *power*, and *system*, were coded in all three data sets, and three of those themes are inherently related. It is interesting to note that only themes for electricity generation were common to all three groups; *distribution* is a theme in the legislator and witness data sets but not the public data set.

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Table 2. Autocoded Themes Ranked by Frequency of Appearance in Each Stakeholder Group Data Set

Public Comment		Witness Written Testimony		Bills & Legislators' Press Releases	
Theme	Count	Theme	Count	Theme	Count
power	497	electric	61	electric	837
electrical	323	generation	53	power	513
water	323	gas	44	service	442
energy	207	power	36	utility	386
grid	165	service	30	energy	384
weather	144	weather	30	generation	380
state	141	market	27	system	260
outages	113	supply	27	customer	227
winter	112	system	25	facilities	226
gas	110	load	24	costs	210
system	103	operators	23	emergency	202
cold	102	companies	22	effective	195
generation	101	emergency	22	organization	187
		price	21	distribution	186
		event	20	region	175
		providers	20		
		capacity	19		
		resources	19		
		customers	18		
		demand	17		
		facilities	17		
		fuel	17		
		health	17		
		natural gas	17		
		winter	17		
		energy	16		
		planning	16		
		areas	15		
		grid	15		
		process	15		
		state	15		
		costs	14		
		distribution	14		
		outages	14		
		storage	14		
		utilities	14		
		nodes	13		

Infrastructure is included in the more general *facilities* theme in the legislator data set and is treated in a much greater level of detail in the witnesses' written testimony, even though that data set is much smaller. Furthermore, the results of the thematic analysis suggest that the witness stakeholder group understood and interpreted the power loss event more similarly to either of the other two groups than those groups did to one another. Of themes that showed up in two data sets, only 4 of the 13 themes found in the legislator data set are also found in the public data set, while 11 of 13 themes found in the legislator data set are also found in the witness data set, and 11 of the 13 themes found in the public data set were also found in the witness data set.

Taken together, the word frequency analysis and the thematic analysis of the two oversight hearings revealed that the three stakeholder groups used certain *topoi* with relative consistency, while others (such as *ERCOT*) indicated very different ways of understanding the February 2021 power loss event. It is to be expected that some of the most salient, significant, or urgent concerns of each group would overlap; after all, some legislators and witnesses also experienced hours or days without power, heat, and water. Technical communicators who are tasked with reconciling technical and nontechnical audiences in situations like this can use the techniques discussed here to better identify specific commonplaces where the respective groups' perceptions of the event diverged from one another or aligned with one another.

Snowpocalypse 2021 was an acute crisis: serious while it lasted, but resolved relatively quickly. In fact, by the time the data for this research project was gathered and analyzed, the crisis was over for most people affected by it. Power had been restored to most of the state within a week, water pipes were repaired or replaced over the following month, and legislators winnowed down the legislation proposed in response to the event. For communicators working through a longer crisis, such as the 2019-2021 COVID-19 pandemic, or for communicators working on chronic or systemic problems in public sphere, using automated content analysis of large, disparate data sets can reveal how various stakeholders perceive issues and express those perceptions through language. Thus, this approach can be a useful tool for technical communication in the public sector who

work to reconcile public and technical knowledge from disparate areas of expertise.

FUTURE RESEARCH

Future research projects may add richness to the current analysis by adding to the existing data sets the transcriptions of the oversight hearings as they become available. The questions that committee members raise and the comments they advance in the oral portion of the hearings may be the most direct window into the process of developing *topoi*. Audiovisual recordings of both the Texas House and Texas Senate hearings have been archived and are accessible through the Texas Legislature Online web site; however, the amount of oral testimony generated by the oversight hearings held on February 25 and 26 is enormous (around 23 hours of video), and transcripts of the hearings are not yet available. In the interest of timeliness, the current study did not undertake to transcribe these interactions. In addition, future researchers might explore the Research Resources compiled for legislators and the public by the Legislative Reference Library of Texas (2021) in advance of the scheduled hearings, as such resources would have served to support legislators' understanding and interpretation of the event.

Future research might explore the links between *topoi* and the way stakeholders who have access to mass media frame the issues therein. For instance, a comparison of the text of press releases to published news stories that use, or do not use, the language of the press releases might give insight into how one group's *topoi* may be used to shape those of another group. Future researchers might explore the organizations' own press releases and other public relations efforts, many of which are substantial. ERCOT, for example, maintains a web page on which is linked market notices, payment plan agreements, presentations and other documents, communication with state legislators and with Congress, public information requests, video archives of media briefings, energy emergency alerts, U.S. Department of Energy orders, and Public Utility Commission of Texas orders. Some of this documentation is highly technical in nature; some is aimed at a various lay audience. Further investigation using these techniques may extend research about media framing in public crises (Culley et al., 2010;

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Giles & Shaw, 2009; Matthes, 2009; Nisbet, Brossard, & Kroepsch, 2003; Pieri, 2019; de Vreese, 2005).

The present study did not undertake to determine the extent to which the public or legislators were able to successfully promote their *topoi* to news media. Pieri (2019) argues that newspaper coverage of crisis, whether in print or online, still matters. News media still have the ability to frame coverage of crises in ways that create “legacies or dependency paths,” that endure beyond the crisis itself and affect how governments and other institutions plan for and respond to future crises (p. 88). Though Pieri’s work specifically addresses pandemic emergencies, Pieri’s conclusions may be applicable to other types of crisis.

This research focused on addressing the following question: *What does the testimony in oversight hearings reveal about how the primary stakeholders of the February 2021 power loss event understood that event?* Qualitative content analysis has been effective in distilling stakeholder *topoi* from a massive amount of expert and nonexpert knowledge acquired from oversight hearing testimony, and this project is but the starting point in an exploration of what public policymakers do with that knowledge. The more that is known, and not just surmised, about stakeholders and how they understand and interpret their technical knowledge, the better we can address further questions about how that knowledge may be communicated throughout the legislative process.

REFERENCES

- Agnew, D. (2021, February 19). As Texans endured days in the dark, the state failed to deliver vital emergency information. *The Texas Tribune*. <https://texastribune.org/2021/02/19/texas-emergency-communication-power-outages>
- Allahyari, M., Pouriyeh, S., Assefi, M., Safaei, S., Trippe, E. D., Gutierrez, J. B., & Kochut, K. (2017). A brief survey of text mining: Classification, clustering, and extraction techniques. *arXivLabs*. arXiv:1707.02919
- Arendt, C., LaFleche, M., & Limperopulos, M. A. (2017). A qualitative meta-analysis of apologia, image repair, and crisis communication: Implications for theory and practice. *Public Relations Review*, 43(3), 517–526. <https://doi.org/10.1016/j.pubrev.2017.03.005>
- Austin, L., Liu, B. F., & Jin, Y. (2012). How audiences seek out crisis information: Exploring the social-mediated crisis communication model. *Journal of Applied Communication Research*, 40(2), 188–207. <https://doi.org/10.1080/00909882.2012.654498>
- Benoit, W. L. (1995). *Accounts, excuses, and apologies: A theory of image restoration*. State University of New York Press.
- Bogain, A. (2020). Understanding public constructions of counter-terrorism: An analysis of online comments during the state of emergency in France (2015–2017). *Critical Studies on Terrorism*, 13(4), 591–615.
- Bormann, E. G. (1985). *The force of fantasy: Restoring the American dream*. Southern Illinois University Press.
- Boswell, C. (2009). *The political uses of expert knowledge: Immigration policy and social research*. Cambridge University Press.
- Cambria, E., Poria, S., Gelbukh, A., & Thelwall, M. (2017). Sentiment analysis is a big suitcase. *IEEE Intelligent Systems*, 32(6), 74–80.
- Carlton, J. S., & Jacobson, S. K. (2016). Using expert and non-expert models of climate change to enhance communication. *Environmental Communication*, 10(1), 1–24. <https://doi.org/10.1080/17524032.2015.1016544>
- Chapman, B. (2020). Congressional Committee resources on space policy during the 115th Congress (2017–2018): Providing context and insight into U.S. government space policy. *Space Policy* 51(2020), 1–12. <https://doi.org/https://doi.org/10.1016/j.spacepol.2019.101359>
- Cheng, M., & Jin, X. (2019). What do Airbnb users care about? An analysis of online review comments. *International Journal of Hospitality Management*, 76, 58–70.
- Christensen, J. (2021). Expert knowledge and policymaking: A multi-disciplinary research agenda. *Policy & Politics*, 49(3), 1–17. <https://doi.org/10.1332/030557320X15898190680037>
- Coles, A. R., & Quintero-Angel, M. (2018). From silence to resilience: prospects and limitations for incorporating non-expert knowledge into hazard management. *Environmental Hazards*, 17(2), 128–145. <https://doi.org/10.1080/17477891.2017.1382319>

- Coombs, W. T. (2004). Impact of past crises on current crisis communication: Insights from situational crisis communication theory. *The Journal of Business Communication* (1973), 41(3), 265–289. <https://doi.org/10.1177/0021943604265607>
- Coombs, W. T., & Holladay, S. J. (2002). Helping crisis managers protect reputational assets: Initial tests of the situational crisis communication theory. *Management Communication Quarterly*, 16(2), 165–186. <https://doi.org/10.1177/089331802237233>
- Culley, M. R., Ogle, O. E., Carton, A. D., & Street, J. C. (2010). Media framing of proposed nuclear reactors: An analysis of print media. *Journal of Community & Applied Social Psychology*, 20(6), 497–512. <https://doi.org/10.1002/casp.1056>
- Dragga, S., & Gong, G. (2014). Dangerous neighbors: Evasive rhetoric and communities at risk. *Technical Communication*, 61(2), 76–94.
- Drumheller, K., & Kinsky, E. S. (2021). Rushing to respond: Image reparation and dialectical tension in crisis communication in academia. *Journal of Applied Communication Research*, 49(4), 406–423. <https://doi.org/10.1080/00909882.2021.1896021>
- Evans, D. P., & Narasimhan, S. (2020). A narrative analysis of anti-abortion testimony and legislative debate related to Georgia's fetal "heartbeat" abortion ban. *Sexual and Reproductive Health Matters*, 28(1), 215–231. <https://doi.org/10.1080/26410397.2019.1686201>
- Frith, J. (2017). Big data, technical communication, and the smart city. *Journal of Business and Technical Communication*, 31(2), 168–187.
- Frulla, D. E. (2012). Congressional response to public crisis: how corporations can prepare. *Journal of Public Affairs*, 12(4), 373–380. <https://doi.org/10.1002/pa.1425>
- Gallagher, J. (2020). Peering into the internet abyss: Using big data audience analysis to understand online comments. *Technical Communication Quarterly*, 29(2), 155–173.
- George, E., & Hovey, A. (2020). Deciphering the trigger warning debate: a qualitative analysis of online comments. *Teaching in Higher Education*, 25(7), 825–841.
- Giles, D., & Shaw, R. L. (2009). The psychology of news influence and the development of media framing analysis. *Social and Personality Psychology Compass*, 3(4), 375–393.
- Graham, S. S., Kim, S. Y., DeVasto, D. M., & Keith, W. (2015). Statistical genre analysis: Toward big data methodologies in technical communication. *Technical Communication Quarterly*, 24(1), 70–104.
- Hancock, K. (2021). *Notice of public hearing*. Texas Senate.
- Kalogeropoulos, A., Negredo, S., Picone, I., & Nielsen, R. K. (2017). Who shares and comments on news?: A cross-national comparative analysis of online and social media participation. *Social Media + Society*, 3(4).
- Karaa, W. B. A., & Dey, N. (2017). *Mining multimedia documents*. CRC Press.
- Lam, C. (2016). Correspondence analysis: A statistical technique ripe for technical and professional communication researchers. *IEEE Transactions on Professional Communication*, 59(3), 299–310.
- Lancaster, A. (2018). Identifying risk communication deficiencies: Merging distributed usability, integrated scope, and ethics of care. *Technical Communication*, 65(3), 247–264.
- Lee, S., & Basnyat, I. (2013). From press release to news: Mapping the framing of the 2009 H1N1 A influenza pandemic. *Health Communication*, 28(2), 119–132. <https://doi.org/10.1080/10410236.2012.658550>
- Legislative Reference Library of Texas. (2021). *Electric power outages and extreme weather events, legislative committee hearings, February 25 and March 4*. <https://lrl.texas.gov/whatsNew/client/index.cfm/2021/2/23/Electric-Power-Outages-and-Extreme-Weather-Events-Legislative-Committee-Hearings-February-25>
- Lundin, M., & Öberg, P. (2014). Expert knowledge use and deliberation in local policy making. *Policy Sciences*, 47(1), 25–49.
- Lundgren, R. E., & McMakin, A. H. (2018). *Risk communication: A handbook for communicating environmental, safety, and health risks*. John Wiley & Sons.
- Ma, L., & Zhan, M. (2016). Effects of attributed responsibility and response strategies on organizational reputation: A meta-analysis of situational crisis communication theory research. *Journal of Public Relations Research*, 28(2), 102–119. <https://doi.org/10.1080/1062726X.2016.1166367>

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- Marvel, J. D., & McGrath, R. J. (2016). Congress as manager: Oversight hearings and agency morale. *Journal of Public Policy*, 36(3), 489–520. <http://dx.doi.org/10.1017/S0143814X15000367>
- Matthes, J. (2009). What's in a frame? A content analysis of media framing studies in the world's leading communication journals, 1990–2005. *Journalism & Mass Communication Quarterly*, 86(2), 349–367. <https://doi.org/10.1177/107769900908600206>
- Menchaca, M. (2021, February 14). Texas' grid operator warns rolling blackouts are possible as winter storm escalates demand for electricity. *The Texas Tribune*. <https://texastribune.org/2021/02/14/texas-rolling-blackouts>
- Menchaca, M., & Ferman, M. (2021, February 12). Massive winter storm prompts disaster declaration and could stress Texas' electric grid. *The Texas Tribune*. <https://texastribune.org/2021/02/12/texas-winter-weather>
- Moore, P. (1992). Intimidation and communication: A case study of the Challenger accident. *Journal of Business and Technical Communication*, 6(4), 403–437.
- Moreland-Russell S., Barbero C., Andersen S., Geary N., Dodson E. A., & Brownson, R. C. (2015). Hearing from all sides: How legislative testimony influences state level policy-makers in the United States. *International Journal of Health Policy Management*, 4, 91–98. <https://doi.org/10.15171/ijhpm.2015.13>
- Muddiman, A., & Stroud, N. J. (2017). News values, cognitive biases, and partisan incivility in comment sections. *Journal of Communication*, 67(4), 586–609. <https://doi.org/10.1111/jcom.12312>
- Nisbet, M. C., Brossard, D., & Kroepsch, A. (2003). Framing science: The stem cell controversy in an age of press/politics. *Harvard International Journal of Press/Politics*, 8(2), 36–70. <https://doi.org/10.1177/1081180X02251047>
- Paddie, C. (2021). *Notice of Public Hearing*. Texas House of Representatives.
- Pieri, E. (2019). Media framing and the threat of global pandemics: The ebola crisis in UK media and policy response. *Sociological Research Online*, 24(1), 73–92. <https://doi.org/10.1177/1360780418811966>
- Price, A. (2021, February 22). Texas politicians saw electricity deregulation as a better future. Years later, millions lost power. *USA Today*. <https://usatoday.com/story/news/nation/2021/02/22/texas-power-grid-outages-did-ken-lays-deregulation-set-calamity/4540029001/>
- Public Utility Commission of Texas. (2021, February 14). *Cold-driven demand makes electricity conservation necessary* [Press release]. <https://puc.texas.gov/agency/resources/pubs/news/2021/PUCTX-REL-COLD21-021421-CONSERVE-FIN.pdf>
- Riffe, D., Lacy, S., Watson, B. R., & Fico, F. (2019). *Analyzing media messages: Using quantitative content analysis in research*. Routledge.
- Ross, D. G. (2013). Common topics and commonplaces of environmental rhetoric. *Written Communication*, 30(1), 91–131.
- Rude, C. D. (1997). Environmental policy making and the report genre. *Technical Communication Quarterly*, 6(1), 77–90.
- Rude, C. D. (2004). Toward an expanded concept of rhetorical delivery: The uses of reports in public policy debates. *Technical Communication Quarterly*, 13(1), 271–288. https://doi.org/10.1207/s15427625tcq1303_3
- Texas Senate. (2021). *Senate Committee on Business & Commerce Interim Report to the 87th Legislature*. <https://senate.texas.gov/cmte.php?c=510>
- Shaffer, R. (2017). Cognitive load and issue engagement in congressional discourse. *Cognitive Systems Research*, 44, 89–99. <https://doi.org/10.1016/j.cogsys.2017.03.006>
- Simmons, W. M., & Grabill, J. T. (2007). Toward a civic rhetoric for technologically and scientifically complex places: Invention, performance, and participation. *College Composition and Communication*, 58(3), 419–448.
- Taylor, C. A., Al-Hiyari, R., Lee, S. J., Priebe A., Guerrero L. W., & Bales, A. (2016). Beliefs and ideologies linked with approval of corporal punishment: A content analysis of online comments. *Health Education Research*, 31(4), 563–575. <https://doi.org/10.1093/her/cyw029>
- The Texas Legislative Council. (2018) *The legislative process in Texas*. <https://tlc.texas.gov/docs/legref/legislativeprocess.pdf>

- United States Energy Information Administration (2021, February 19). Extreme winter weather is disrupting energy supply and demand, particularly in Texas. *Today in Energy*. <https://lrl.texas.gov/whatsNew/client/index.cfm/2021/2/23/Electric-Power-Outages-and-Extreme-Weather-Events-Legislative-Committee-Hearings-February-25>.
- Vaismoradi, M., & Snelgrove, S. (2019, September). Theme in qualitative content analysis and thematic analysis. *Forum Qualitative Sozialforschung/Forum: Qualitative Social Research*, 20(3).
- de Vreese, C. H. (2005). News framing: Theory and typology. *Information Design Journal + Document Design*, 13(1), 51–62.
- Wendling, C., Radisch, J., & Jacobzone, S. (2013). The use of social media in risk and crisis communication. *OECD Working Papers on Public Governance*, 24. <https://doi.org/10.1787/5k3v01fskp9s-en>
- Williams, M. F. (2009). Understanding public policy development as a technological process. *Journal of Business & Technical Communication*, 23(4), pp. 448–462. <https://dx.doi.org/10.1177%2F1050651909338809>
- Winsor, D. A. (1988). Communication failures contributing to the Challenger accident: An example for technical communicators. *IEEE Transactions on Professional Communication*, 31(3), 101–107.
- Yanow, D. (2000). *Conducting interpretive policy analysis*. SAGE Publications.
- Youngblood, S. A. (2012). Balancing the rhetorical tension between right to know and security in risk communication: Ambiguity and avoidance. *Journal of Business and Technical Communication*, 26(1), 35–64.

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Jackie Damrau, Editor

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The reviews provided here are those that are self-selected by the reviewers from a provided list of available titles over a specific date range. Want to become a book reviewer? Contact Dr. Jackie Damrau at jdramrau3@gmail.com for more information.

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Experiencing Design: The Innovator's Journey

Jeanne Liedtka, Karen Hold, and Jessica Eldridge. 2021. Columbia University Press. [ISBN 978-0-231-19426-6. 288 pages, including index. US\$29.99 (hardcover).]



Experiencing Design: The Innovator's Journey targets professional organizations who want a design methodology that fosters collaboration and innovation. The book lays out the theory and practice of “Design Thinking”: the authors argue this approach creates fundamental mindset shifts in participants and more innovative design outcomes.

Design Thinking is a six-stage process of familiar activities structured in an intentional way: “. . . they are sequenced in such a way that their effects are *cumulative* as the journey progresses. They insist on both action and reflection. As a result, they trigger fundamental shifts in mindsets as well as skillsets” (p. 16, emphasis in original). Through the six stages—immersion, sensemaking, alignment, emergence, imagining, and learning in action—designers learn to engage emotionally with the customer and other team members, finding creative solutions to clearly defined problems.

The first half of the book delves into each stage with helpful charts outlining specific group activities as well as a checklist of questions to evaluate your own mindset as a team member. For example, in Immersion, specific activities like shadowing users, creating journey maps, and performing ethnographic interviews help recalibrate your mindset from an egocentric to empathetic, which leads to better problem definition for your target customers (pp. 36–37).

The latter half of the book is focused on practical application personally and within your organization. The authors present four team member personas (the Driver, the Influencer, the Analyst, and the Supporter); they describe the challenges each persona faces during specific stages of the process and offer facilitator tips to keep team members engaged (p. 146). The Supporter, for example, dislikes inter-personal conflict and may stifle their own good ideas to keep the peace; you can mitigate this by allowing insights to be submitted anonymously and/or enforcing turn-taking in a structured brainstorming session. (pp. 197–198).

Finally, the authors elaborate on personal and organizational development planning and explain the assessment tools included in the appendices to

measure a starting point for Design Thinking in your organization. Design Thinking processes foster equity and inclusion in the organization and make team members more invested in strategic planning (pp. 224–225).

Although there is more to dive into in *Experiencing Design*, there are a couple of takeaways that seem consistent across the Design Learning process. Firstly, disengaging your ego is key: not only does thinking from the perspective of others improve problem identification in the early stages of the process, but it also enables you to let go of bad ideas or even nearly finalized designs further along when they prove lacking in testing (p. 122). Secondly, make it visual: “visualization tools are key drivers behind the transformational power of DT” (p. 98). The human brain is wired for pictures, so make ideas comprehensible by using sketching, videos, user journey maps, or even Lego construction in your design process from brainstorming to prototyping and testing.

Overall, *Experiencing Design* is well crafted with a balance of theory and practice. I would recommend it to team leaders who want to establish a more intentional design methodology for their organization.

Bonnie J. Shamp Winstel

Bonnie J. Shamp Winstel is the Assistant Manager of Software Development for Book Systems, Inc. in Huntsville, Alabama. She received her master's degree in English and Technical Communication at the University of Alabama-Huntsville in May 2013.

Media Capture: How Money, Digital Platforms, and Governments Control the News

Anya Schiffrin, ed. 2021. Columbia University Press. [ISBN 978-0-231-18883-8. 316 pages, including index. US\$30.00 (softcover).]



When the news media falls under the control of business tycoons, governments, profit maximizing digital platforms, or special interests, a whole host of ills ensues. The supply of accountability reporting, professionally verified information, and informed debate—the lifeblood of civil society—lessens and gives way to propaganda, demagoguery, trumped-up distractions, and narratives crafted to serve the interests of powerful elites.

Media Capture: How Money, Digital Platforms, and Governments Control the News documents how, over the past several decades, media capture has become a global problem that threatens the existence of open and democratic societies.

In a series of chapters written by leading journalists and researchers from around the world, *Media Capture* provides a sweeping and penetrating analysis of the problem from multiple viewpoints. Together they detail the myriad ways media capture works, and how its effects spill out into the larger society, abetting economic and political corruption, exacerbating such problems as wealth concentration and economic inequality, and warping the public debate on vital issues.

An introductory overview provides historical context and shows how the digital-platform-precipitated collapse of the news media's traditional advertising-based business model greased the skids for capture. Rich individuals with political agendas buy up financially stressed outlets, while anyone in a position to fund journalism gains the ability to exercise an outsized influence.

Several contributors explore the role that media capture plays in political and economic corruption and in the rise of rightwing demagogues in Hungary, Turkey, India and elsewhere. Others examine the many capture problems plaguing digital news production, among them the compromises forced by insatiable demands for content without respect to quality, and the problem of policing digital payola in open contributor networks. In addition, the platforms, through their outsized influence, and problematic relationship with bad actors, are inviting calls for regulation—much of it highly partisan—that could lead to yet more capture.

Capture can be heavy handed, but it can also use a lighter touch, offering financial and other support, but leaving journalists conflicted over how to cover issues that might annoy funders. A US example examines how a handful of libertarian-minded billionaires have incorporated media capture into their crusade to “reform” and privatize education, funding various philanthropic initiatives and media partnerships to churn out coverage, and even launching their own news outlets.

Arguing that independent journalism is a vital public good and that the for-profit model has largely failed, the last third of *Media Capture* covers various

strategies and proposals for combatting media capture. Among the ideas discussed are alternative forms of financing, including creating trusts for investigative reporting, and a system that would let individuals contribute a small portion of their taxes to a non-profit media outlet of their choice.

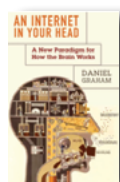
Anyone interested in the health of journalism, or in the open society upon which it depends, will find much of value in this essential and deeply-informed book.

Patrick Lufkin

Patrick Lufkin is an STC Fellow with experience in computer documentation, newsletter production, and public relations. He reads widely in science, history, and current affairs, as well as on writing and editing. He chairs the Gordon Scholarship for technical communication and co-chairs the Northern California technical communication competition.

An Internet in Your Head: A New Paradigm for How the Brain Works

Daniel Graham. 2021. Columbia University Press. [ISBN 978-0-231-19604-8. 344 pages, including index. US\$30.00 (hardcover).]



“But metaphors—and especially technological metaphors—have been critical in the history of science, and they will continue to be so as we get closer to understanding the brain” (p. 27). Even before modern technology allowed us to use tracers and imaging techniques on the brain, philosophers and scientists used metaphors to encompass the intricacy and complexity of this critical organ. Seventeenth century philosopher René Descartes likened the brain to the plumbing behind the grand waterworks of the Palace of Versailles—water was pumped uphill from a nearby river—and artfully expelled several meters high on display—delivering more water than was supplied to all of Paris. Building upon this premise, Nobel Prize winner Charles Sherrington likened neurons to “valve-like” structures. Charles Darwin, famous for his work on evolutionary theory, was unable to conceptualize the brain, partly because he had no metaphor for it. He believed thoughts were secreted by the brain, like digestive chemicals. Gottfried Leibniz, co-inventor of calculus, suggested the brain was a type of mill—this suggests different processes operating at different levels. This

morphed into the modern-accepted metaphor of the brain as a computer.

In *An Internet in Your Head: A New Paradigm for How the Brain Works*, computational neuroscientist Daniel Graham argues that although the computer metaphor for the brain is helpful and somewhat accurate, it is ultimately obsolete. Many current research observations and discoveries suggest an organ more akin to a network communicator, or an Internet. “There is no doubt that the computer metaphor has been helpful and that the brain does perform computations. But neuroscience based on the computer metaphor is incomplete because it does not consider the principles of network communication. Neuroscientists are starting to realize that, in addition to performing computations, the brain also must communicate within itself” (p. viii).

Graham cites experimental evidence for the flaws in the computer model: In a controlled study of monkey brains compared with a deep net artificial intelligence system, the deep net system predicts less than half of the neuron activity over time. Besides showing the inadequacy of a deep net, this experimental evidence suggests the system is missing the most important signals occurring in the monkey brains.

For the rest of *An Internet in Your Head*, Graham provides a comprehensive analysis of the ways in which the Internet does and does not correlate to what scientists currently understand about the functionality of the brain. Flexible routing, asynchronous communication, management of errors, background noise, overall growth of the network (and other phenomena) can all be explained in more depth by an Internet-like structure rather than by a computer. Graham argues that a structure of multiple hubs connected in multiple ways creates a net of communication on many different levels. A problem with his analysis is that some of the vocabulary and experimentation is very specific to the field and an understanding of both electronics and neuroscience seems required to follow all the arguments.

And ultimately, scientists don’t have the ability to experiment with the brain’s innerworkings. “Many of the limitations are procedural: it boils down to the fact that living brains, particularly human brains, are difficult to study, whereas single neurons are tractable” (p. 67).

Julie Kinyoun

Julie Kinyoun is an on-call chemistry instructor at various community colleges in Southern California. An avid reader, she enjoys reviewing books that help her become a better educator.

Planet on Fire: A Manifesto for the Age of Environmental Breakdown

Mathew Lawrence and Laurie Laybourn-Langton. 2021. Verso. [ISBN 978-1-78873-877-4. 280 pages. US\$24.95 (hardcover).]



Planet on Fire: A Manifesto for the Age of Environmental Breakdown by Mathew Lawrence and Laurie Laybourn-Langton is a high energy book with a bold, expansive vision for democratizing the state “so it can steer the economy towards sustainability and justice” (p. 16). The first three chapters cover how the world has reached the environmental crisis it is currently in, and the second half discusses a vision and strategies for getting out of this crisis. That vision and those strategies are what make and break this book.

“The environmental crisis is fundamentally a crisis of politics” (p. 226), a point that is thoroughly unpacked in the first half. Power and the accumulation of wealth through economic models that support unrestrained and unchecked capitalization are the driving forces of environmental breakdown according to the authors. They also contend that these models cannot be allowed to subsist because the consequences of capitalism are not only environmental; they are also unjust and inhumane.

One strength of *Planet on Fire* is that it does not dwell on the negative and quickly moves on to their vision and strategies for getting out of this crisis. This vision, which aligns with the Green New Deal, seeks to “dismantle hierarchies of wealth, class, gender, race and power in society, replacing them with democratic relationships and powerful collectives” (p. 77). The problem with the vision and strategies, however, is that the scale is far beyond anything that the average citizen,

thus reader, may feel empowered to do anything about. Their way out of this crisis requires rewiring corporate governance, creating a new legal infrastructure and a “network of national and regional social wealth funds” (p. 157), democratizing pension, labor, and energy systems, and so much more. Although well-researched, ambitious, and socially just, I found these chapters alienating because they were written at the system level and required knowledge of finance and economics at that level. Consequently, I was lost, and more important, I felt hopeless about what one individual, I, could do to make any of this happen.

Although I appreciate their vision, it is still unclear to me how any of this can take place, and I did not feel better, but worse, about the current environmental situation after reading this book. In the last chapter they reference how Margaret Thatcher pulled off the same level of transformation that they suggest, but this reference is not helpful for the younger generations who may not know who she is, what she did, or remember her struggle. It may be that *Planet on Fire* is intended to stimulate new narratives, as they call for in the last chapter, and if that is the beginning of this process, then the book might work in a group situation like a class or book club. My question, though, is do we have time to just now start conversations? A book written on a scale of individual action might have been more effective in inducing action.

Diane Martinez

Diane Martinez is an associate professor of English at Western Carolina University where she teaches technical and professional writing. She previously worked as a technical writer in engineering, an online writing instructor, and an online writing center specialist. She has been with STC since 2005.

97 Things Every UX Practitioner Should Know: Collective Wisdom from the Experts

Dan Berlin, ed. 2021. O'Reilly Media. [ISBN 978-1-492-08517-1. 280 pages, including index. US\$44.99 (softcover).]



The latest addition of O'Reilly's *97 Things Every UX Practitioner Should Know: Collective Wisdom from the Experts* touches on accessibility, emotional strategy, and other core usability research elements. It follows the publisher's established pattern for their 97 Things series with two- to three-page essays written by nearly 100 contributors. (Many contributors listed contact information in their bios.) The book is divided into five sections relating to the following topics: career, strategy, design, content, and research. The bulk of essays focus on design and research.

Each section shared useful information for any usability engineer. Readers will find some essays more pertinent than others for their individual career needs. For example, Taylor Kostal-Bergman wrote about learning from your worst job to improve your usability experience (UX) skills. She found some members of immature organizations resistant to UX and states, “. . . it is our responsibility to understand this and work through it” (p. 4). Erin Malone discussed the principles of Gestalt for readers who may not have a design background (p. 63). Benson Chan listed steps to build trust and insight with end users and stakeholders (p. 79). Monet Burse Moutinho explained how to create a reflexivity framework to examine the reader's own beliefs and how those beliefs affect their work (p. 145). Joe Sokohl cleverly related information architecture to cleaning a basement (p. 40).

97 Things Every UX Practitioner Should Know shares insights from professionals who have spent years in the field. It is an easy read for anyone interested in usability. That said, it is not intended to provide step-by-step tutorials. Readers looking for in-depth knowledge and training about specific facets of user experience will not find that information here. Instead, this book feels like a collection of good blog posts (minus the color and graphics) or an enjoyable chat with a bunch of intelligent colleagues.

Stephanie Saylor

Stephanie Saylor is a technical writer and usability engineer at Yellow Duck Technologies, Inc. She received her master's degree in digital communication from Johns Hopkins University.

Getting to the Heart of Science Communication: A Guide to Effective Engagement

Faith Kearns. 2021. Island Press. [ISBN 978-1-64283-074-3. 258 pages. US\$30.00 (softcover).]



The traditional notion that science communication depends solely on clear explanation of an objectively correct message to a homogeneous “general public” never made much sense. Nonetheless, it became dogma because scientists primarily

spoke to members of their own discourse community and rarely looked beyond its bounds. But increasingly, as scientific communication has become its own discipline, repeated and serious communication failures have come under the microscope. This analysis has led practitioners to increasingly embrace a model in which dialogue replaces monologue, since only two-way communication can create the relationships required to persuade an often-adversarial audience to listen to what we’re trying to say.

In *Getting to the Heart of Science Communication: A Guide to Effective Engagement*, Faith Kearns reminds us of just how important relationships are in supporting that dialogue. Indeed, “community is foundational” (p. 185), and without a sense of trust and shared purpose (without *community*), many factors can undermine the dialogue required to ensure that communication happens. Writing from the perspective of a scientist who’s also deeply involved in public outreach, Kearns provides a practitioner’s perspective, supplemented by dozens of examples from working scientific communicators that reveal the pleasures, challenges, and stresses of their work. These human-centered stories are those of communicators from diverse ethnic, cultural, and gender backgrounds. They both reinforce the humanity of scientific communication and its practitioners, and represent concise case studies of how communication succeeds or fails.

An essential insight is that communication is both conscious/rational and subconscious/emotional. Focusing solely on objective facts and how to present them clearly, as most of us have been trained to do, neglects the critical role an audience’s emotions play in shaping their perceptions of our message. This is doubly true when information is filtered through a listener’s preconceptions. Careful listening and a willingness to change or broaden our own beliefs will be required when our goal is to establish a mutually

respectful relationship that supports acceptance of our message and motivates change. We must strive to connect, empathize, and support rather than to challenge, contradict, and pressure. Outsiders always face resistance, hostility, and skepticism, particularly if they represent a group that has traditionally neglected, exploited, or even abused the audience. Differences in the power available to speaker and audience raise additional barriers.

Although Kearns focuses on scientific communication, she offers many lessons for communicators in other disciplines who are willing to challenge their worldview. She invites us to “get off the stage and wade into the “mess” along with everyone else” (p. 227) and provides the tools we need to accept that invitation. What improvements might be possible in our ongoing efforts to communicate technical information if we began moving from one-way dictation to two-way dialogue?

Geoff Hart

Geoff Hart is an STC Fellow with more than 30 years of writing, scientific editing, translation, and information design experience. He’s the author of two popular books, *Effective Onscreen Editing* and *Writing for Science Journals*.

Conversations with Things: UX Design for Chat and Voice

Diane Deibel and Rebecca Evanhoe. 2021. Rosenfeld Media. [ISBN 978-1-933820-86-1. 322 pages, including index. US\$41.99 (digital).]



Conversations with Things: UX Design for Chat and Voice provides an approach to the design of conversational systems that includes best practices ranging from an examination of the building blocks of human conversation to considerations for designing inclusive conversations. The book takes on the problem that, despite the growing prevalence of conversational interfaces, or “technolog[ies] that you talk with, whether you’re speaking out loud to it or chatting by typing,” “the technology is a long way from reaching its full potential, in part because people don’t know how to design for interactions where language is the primary way of exchanging information” (p. xvi). For the authors, this problem is rooted in a misunderstanding of both what makes a good

conversation and how technology can be designed to imitate good conversations.

The authors examine a range of pertinent topics, from how technologies can talk like people (pp. 11–38) to crafting trustworthy artificial personalities (pp. 39–68) to documenting conversational pathways (pp. 127–158) to researching and prototyping actual conversational interfaces (pp. 215–244). In this way, the book contains a complete methodology for conversational design that educates readers on its underlying principles, methods, and important considerations.

If readers have only a passing familiarity with conversational design, they are in for a surprise regarding the sheer breadth and scope of this emerging field. We learn that the field “has its own lingo” even though “people across the industry use different terms for the same thing” (p. xvii). This diversity is highlighted by screenshots of tweets from experts in the field. According to the authors, this lingo includes terms that describe aspects of conversational design that novices to this conversation will undoubtedly be unfamiliar with, such as “voice assistant ecosystem,” “adjacency pair,” “the cooperative principle,” and “affinity bias,” as well as many others (pp. 3, 19, 34, 59). The authors carefully define all terms that provide a background for the field that they describe as a mixture of linguistics, philosophy, and user experience.

The authors also include tips, techniques, and cases of conversation design, ranging from explorations of different types of questions (p. 75) to methods of mapping the pre-programmed flow of conversations (p. 134) to cases in which conversation design has impinged on the right to privacy (p. 208). These tips touch on timely topics such as how to avoid racist stereotypes (p. 57) and the importance of considering the entire gender spectrum (p. 62). Chapter 11 is noteworthy for its savvy introduction to the inclusive design conversation, including further reading on this topic (p. 270).

Overall, readers will find a thorough, nuanced discussion of this emerging field. Though the book doesn’t cover every possible aspect of conversation design, *Conversations with Things* stands out as a complete and current book on the topic. More importantly, the book is written so a complete novice can understand the topic, but it also contains a wealth

of wisdom that seasoned professionals will find useful as a reference guide.

Guiseppe Getto

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Surveys That Work: A Practical Guide for Designing and Running Better Surveys

Caroline Jarrett. 2021. Rosenfeld. [ISBN 978-1-933820-53-8. 372 pages, including index. US\$49.99 (softcover).]



I wish I had read *Surveys That Work: A Practical Guide for Designing and Running Better Surveys* years ago—before inflicting “big honking” surveys on my poor participants. Fortunately for all of us, Caroline Jarrett’s book is now available, and it’s an indispensable resource for those who employ surveys in their research.

If you’re looking for a book that explains how to write logical survey questions, there’s a chapter on that. Jarrett takes a more comprehensive approach by describing the process of designing, running, compiling, and reporting a survey—not just designing a questionnaire. Jarrett is careful to define “survey” as the research method and distinguishes “questionnaire” as an instrument that fits within the broader surveying process.

Surveys That Work breaks the survey process down to seven essential stages:

1. **Establish your goals for the survey.** At this stage determine your research question—exactly what it is that you want to learn—and what decisions will be made based on the answers. Identify who can help answer your research questions, and what resources and how much time you’ll need. Determine whether a survey is even the best method to answer your research question.
2. **Find people who will answer.** Identify and understand your participants. Identify the burning issue—the topic they really want to talk about. They have needs, wants, time constraints, and privacy expectations that will influence response rates.

3. **Write the test questions.** Make your questions easy to understand. Be sure to address your research question and the participants' burning issue.
4. **Build and test the questionnaire.** Make your questionnaire easy and interesting for your participants to complete. Test the usability of the survey, modify any problematic questions, and test again.
5. **Get people to respond.** Launch your questionnaire and track completions.
6. **Turn data into answers.** At this point, determine which responses are viable, code your responses, and look for emergent themes.
7. **Show the results to decision makers.** Determine what the story from the survey data describes numerically. Decide how, when, where, and to whom you will present your results.

Interspersed between these chapters are spotlights that focus on specific aspects of surveys that you've always wondered about. One spotlight compares four different survey types. Another spotlight explains those ubiquitous Net Promoter Score® surveys. And yet another spotlight explores the quandary of measuring user satisfaction.

Jarrett offers practical guidelines based on years of experience and research. Some "rules" should be taken with a grain of salt. For example, on page 34, Jarrett says "The rule is: [sic] interview first, survey later." This rule needs to be explained more fully or contextualized. Many dissertations, journal articles, and mixed-methods research projects have employed surveys and then employed follow-up interviews to gather qualitative data that contextualize the quantitative survey data. These studies have used follow-up interviews successfully, which suggests this "rule" requires further investigation.

Jarrett's conversational style makes *Surveys That Work* easy to read. Its principles are lavishly illustrated with narrative case studies and colorful images. Whether you're a seasoned surveyor or a novice trying to navigate this research method, this book offers actionable advice and memorable examples.

Michael Opsteegh

Michael Opsteegh is an STC Associate Fellow and a technical writer in the software and financial services industries since 2004. He is a lecturer in the professional writing program at Cal State Long Beach. Michael holds a master's degree in English and is a Certified Technical Professional Communicator (CPTC).

A Spectator Is an Artist Too: How We Look at Art, How We Behave Around Art

Johan Idema. 2020. BIS Publishers. [ISBN 978-90-6369-590-3. 176 pages, including index. US\$19.99 (softcover).]



What happens when you see a work of art that is beautiful, puzzling, irritating, or challenging? That is a question posed in the visual feast that is *A Spectator Is an Artist Too: How We Look at Art, How We Behave Around Art* which itself made me think it—the book—too is a work of art.

We can learn something from *A Spectator Is an Artist Too* to apply to our own work as we imagine how our audiences respond to what we create. The end user is an element, of course, to consider whether you are an artist creating a work of art or a technical communicator creating an end product.

Idema looks at how people interact with art with examples where he shows people looking at works of art and interacting with them. An example is of people almost kissing statues (pp. 84–85). Another example is of people showing a thumbs down to a work of art created by Renoir. Yet another example is of a person standing the same way as a work of art (pp. 66–67) or "photographing your girlfriend" (p. 108).

This made me think of usability testing where we see how people interact with instructions. Of course, people do not interact with instructions by kissing. But they might give instructions a thumbs down.

A Spectator Is an Artist Too also makes a statement about how museum visitors can have a response to art. This response can be casual and creative and certainly not stuffy, reserved, or formal. Idema also makes several statements about Instagram, art museums, and sharing.

Jeanette Evans

Jeanette Evans is an STC Associate Fellow; active in the Ohio STC community, currently serving on the newsletter committee; and co-author of an *Intercom* column on emerging technologies in education. She holds an MS in technical communication management from Mercer University.

Lived Experiences of Ableism in Academia: Strategies for Inclusion in Higher Education

Nicole Brown, ed. 2021. Policy Press. [ISBN 978-1-4473-5411-6. 336 pages, including index. US\$42.95 (softcover).]



As someone with an invisible disability in academia, I know firsthand how daunting meeting the everyday expectations in a highly competitive environment can be. As Laura L. Ellingson points out in the first chapter, there seem to be few good options for disabled academics, leaving many struggling to work with minimal or no accommodations rather than risk asking for accommodations and being surreptitiously penalized in the tenure and promotion process (p. 27). This is why a book like *Lived Experiences of Ableism in Academia: Strategies for Inclusion in Higher Education* is so necessary. This collection of narratives, edited by Nicole Brown, is essential reading for both disabled academics and academics wishing to understand their disabled colleagues better.

Lived Experiences of Ableism in Academia consists of 18 chapters written mostly by disabled British academics in a variety of fields. The authors discuss their experiences with navigating academic life and their experiences with ableism in academia through the lens of personal narratives and auto-ethnographies. The disabilities discussed run the gamut from hearing impairment to autism, mobility impairments, depression, and more. These narratives adeptly frame the issue of disability within the neo-liberal structure of the academy, but at the same time they are touchingly personal and raw. The authors bring to light issues which are normally avoided in the rational world of academics such as grief and loss, learning to readjust after a disability, dealing with both covert and overt ableism, and avoiding internalized ableism.

There are few flaws to this text. The only major issue that I could pinpoint is that because all except one of the authors are from the United Kingdom (UK), some of the discussion might be confusing to readers in other countries with different academic systems and disability laws than those of the UK. There wasn't much of an effort on most of the authors' part to clarify these issues for foreign readers with little to no knowledge of these concepts.

Lived Experiences of Ableism in Academia is essential reading for many audiences. I could envision this text as reading for a graduate course in disability studies, or

as supplementary reading for graduate students about to enter the academy. However, disabled academics themselves would likely benefit most from reading this text. Many of the narratives so closely mirrored the experiences I have had and the frustration I have felt while struggling with my disabilities that I found myself in tears. It was a massive relief to know that I was not alone in my struggle, and I am sure many other disabled academics would benefit from reading this text as I have.

Nicole St. Germaine

Nicole St. Germaine is a Professor in the Technical and Business Writing Program at Angelo State University, as well as a freelance writer and consultant. Her research interests include technical communication for a Mexican American audience and technical communication in the health fields.

Teaching Business, Technical and Academic Writing Online and Onsite: A Writing Pedagogy Sourcebook

Sabrani Sen Vengadasalam. 2021. Cambridge Scholars Publishing. [ISBN: 978-1-5275-6873-0. 147 pages. US\$99.95 (hardcover).]



Sabrani Sen Vengadasalam's *Teaching Business, Technical, and Academic Writing Online and Onsite: A Writing Pedagogy Sourcebook* is a helpful guide for new instructors and others who are looking for new assignments or approaches for business, technical, and academic writing courses.

According to Sen Vengadasalam, there are "three key aspects of facilitating a class successfully: instructional design, participation management, and multimedia use" (p. x). The book is a composite of her previously published articles that address these three aspects through shared assignments, pedagogical approaches, and multimedia resources, most especially in reference to business and technical writing courses. It is divided into two parts and six chapters. Part I consists of a chapter on the importance of project writing that teaches beyond the genre and includes attention to audiences and purposes that extend beyond the classroom and prepares students for workplace writing. Through project writing as described in this chapter, students learn how audience and purpose impact writing. Another chapter explains

transformative pedagogy and the importance of scaffolding assignments. And the last chapter in that section addresses the need for and benefits of a graduate or PhD course on Writing for Publications with an interdisciplinary approach to teaching publication writing and use of online peer reviews.

Part II includes chapters on facilitating higher-ordered learning through discussion boards in online classrooms, how to use open educational resources (OER) in business and technical writing courses in ways that promote engagement and enhance learning experiences. In this chapter, she explains that although many educational materials are available on the Internet, instructors may wish to use resources from official OER repository sites of which she shares many options. The chapter is more than just sharing resources and includes best practices for using OER and three distinct ways that they can be used in business and technical writing courses. The last chapter addresses the need for teaching infographics along with best practices and a rubric.

Each chapter includes some sort of approach, rubric, or evaluation scheme denoted by an acronym or abbreviation. I was not sure if that was intentional or not, but such mnemonic devices might be helpful for some readers, especially new instructors. Even though *Teaching Business, Technical, and Academic Writing Online and Onsite* is a collection of the Sen Vengadasalam's previously published works, it does have a common theme and the articles do go beyond just sharing assignments and resources by discussing best practices and ways to engage students in deep learning that will benefit them in the workplace. Many of the chapters include sample syllabi, rubrics, and other helpful resources that pertain to the assignments or approaches discussed in those chapters, and there is discussion about various teaching modalities as well. It is, as the title implies, a handy pedagogical sourcebook.

Diane Martinez

Diane Martinez is an associate professor of English at Western Carolina University where she teaches technical and professional writing. She previously worked as a technical writer in engineering, an online writing instructor, and an online writing center specialist. She has been with STC since 2005.

Get Hired Now! How to Accelerate Your Job Search, Stand Out, and Land Your Next Great Opportunity

Ian Siegel. 2021. John Wiley & Sons, Inc. [ISBN 978-1-119-79442-4. 210 pages, including index. US\$19.95 (hardcover).]



Get Hired Now! How to Accelerate Your Job Search, Stand Out, and Land Your Next Great Opportunity opens with explaining how every interviewer is biased and that 75% of all résumés are read by applicant tracking systems designed to reject you.

We found that a discouraging way to open a job-hunting book. However, Ian Siegel did give tips on how to get past said applicant tracking systems.

It is the reviewers' opinion that the best way to get a new job is through personal referrals in your network or (even better) being so professionally visible that organizations ask you to work for them. Siegel doesn't discuss building a professional brand but does talk about online branding (also known as your online footprint). The book then discusses ways to clean up your social media feeds such as purging public-facing posts.

Next, Siegel talks about job hunting using your network or a professional recruiter, which the reviewers' thought is excellent advice. The next chapter, however, contained advice we felt was wrong, such as apply for online jobs with one click, the best time to apply for a job is one second after it is posted, and feel free to apply for jobs where you only match 40% of the job requirements.

In the final few chapters of *Get Hired Now!*, Siegel covers the basics of what to wear in an interview, how to respond to interview questions, and so on. This information was overall useful, yet we also disagreed with the quoted statistics (you only get one second to make a good impression?).

In all our speaking and writing engagements, we always tell the audience, "Nothing is true unless it is true for you. Don't take what we tell you as true without trying it yourself. If it works for you, great! If it doesn't, modify it for your situation or discard it altogether."

We would caution you to do the same with *Get Hired Now!*. Keep what works for you, discard what doesn't, and use it to get hired now!

Jack Molisani and Kevin Meglic

Jack Molisani and Kevin Meglic are recruiters at ProSpring Technical Staffing, an employment agency specializing in content professionals: www.ProSpringStaffing.com. Jack authored *Be the Captain of Your Career: A New Approach to Career Planning and Advancement*, which hit #5 on Amazon's Career and résumé best seller list. Connect with Jack and Kevin on LinkedIn, or email Jack@ProSpringStaffing.com.

Information Now: A Graphic Guide to Student Research and Web Literacy

Matt Upson, Holly Luetkenhaus, C. Michael Hall, and Kevin Cannon. 2021. 2nd ed. University of Chicago Press. [ISBN 978-0-226-76611-9. 124 pages. US\$18.00 (softcover).]



Can you believe my Technical Communication editor sent me a comic book to review? No, wait a minute, that's not it at all! Imagine my pleasant surprise when this graphic novel, *Information Now: A Graphic Guide to Student Research and*

Web Literacy by Matt Upson, Holly Luetkenhaus, C. Michael Hall, and Kevin Cannon turned out to be an excellent (and enjoyable) text on research procedures and web literacy.

While the treatment is novel, and quite a departure from the usual academic presentation, the material is right on the mark. Once you adjust your "textbook" expectations, the authors present you with a most readable, highly organized, and quite thorough exploration of research methodologies covering all aspects from the Dewey Decimal system to advanced Web searches; from ethics and validity to bias and misinformation.

The initial chapters deal thoroughly with the details of information systems, data base types, search protocols, and so on. The authors bring rather dry subjects to life by witty writing and playful animation. Terminating each section is an excellent group of critical thinking exercises focused on the covered

material. I found the questions to be well designed and quite usable.

The advice for evaluating sources is particularly well-developed. In Chapter 6, the authors discuss Mike Caulfield's SIFT method (stop, investigate the source, find more [or better] coverage, and trace claims, quotes, and media back to their original content) for fact checking information found online (pp. 87–92). They also explore the different options students have when searching for information both on the Web and in academic journal databases.

Upson, Luetkenhaus, Hall, and Cannon explain well the complexities of algorithms and how they inherently bias and alter results when searching information randomly on the Web. That's why their strategies on searching for and evaluating information are especially valuable.

The authors also give validity to Wikipedia and Google Search, two things I was happy to see because, like the authors, I argue that they are places to start any information search. Wikipedia has lists of references and Google Search provides the most popular search items. The book covers search strategies, both for the Web and for library databases, in detail and contains guidelines for using advanced features.

The comic book format makes it exceptionally easy to cover a significant amount of material in a most approachable manner. If this material were presented in a handbook, it would not be as engaging, clever, or innovative.

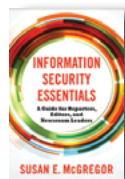
Having taught college composition classes, I would highly recommend *Information Now* as a superb companion text. The relatable dialogue, engaging graphics, and creative approach to the subject matter will keep students reading and even enjoying the book.

Lynne Cooke

Lynne Cooke is a Clinical Assistant Professor at Arizona State University where she teaches courses on usability, digital media, and portfolio development. She is also a member of the Arizona Chapter of STC and the Internship Coordinator at ASU.

Information Security Essentials: A Guide for Reporters, Editors, and Newsroom Leaders

Susan E. McGregor. 2021. Columbia University Press. [ISBN 978-0-231-19233-0. 222 pages, including index. US\$30.00 (softcover).]



If you want a step-by-step guide of how to secure information in an abstract, “standard” newsroom, this is the wrong book. Risk assessment starts with the specifics of a particular organization and here, especially, the people working for it,

Susan McGregor emphasizes. A young woman of color covering an incident in a mostly white rural area may face different threats than an older white man investigating the same incident.

That said, McGregor does discuss specific steps that small, mid-sized, and large newsrooms should consider when designing their information security policies. However, such policies are only as good as their implementation—if they interfere too much with journalists’ newsgathering, they won’t be followed. Thus, editors and journalists must be included in decision-making about the processes and tools used to ensure that journalists, the information they gather, and the sources they consult are protected against threats—both in real life and online.

A thorough assessment of the news outlet’s processes—from receiving pitches, to researching stories and contacting sources, all the way to interacting with readers after the story has been published—should form the basis for determining potential vulnerabilities and how to address them. This includes considering the legal framework, reporting from the field or the home office, handling freelancers and community contributors, and moving the story through the editing and publishing process. McGregor covers all these topics and adds chapters on the threats faced by the profession as a whole and what the future may bring.

Information Security Essentials: A Guide for Reporters, Editors, and Newsroom Leaders is written for US-based journalists, editors, and news organizations. A chapter on reporting abroad addresses the special risks that crossing borders pose to equipment and notes. These risks are not limited to being in conflict zones, as the example of Seth Harp, a *Rolling Stone* reporter whose devices and notes were searched by US border patrol when he returned from a reporting trip to Mexico shows (pp. 78, 81). This is just one example that McGregor includes to illustrate the need for addressing

specific information security concerns. She also includes examples of information security done right, such as a case study of journalists’ investigations based on the Panama Papers (a trove of leaked documents that exposed a network of financial wrongdoings). Check out www.icij.org/investigations/panama-papers/ for more information about this.

Many information security habits she suggests in chapter 4, *Everyday Essentials*, would be useful for non-journalists, too. Separating private and personal social media accounts, for example, keeps your boss from knowing about your aunt Sally’s habit of posting spicy videos to Facebook. Regularly backing up important data should be a matter of course for anyone who works with digital tools, but often takes a backseat to work on deadline.

Information Security Essentials is a good reminder of how important basic information security is for everyone, and how even non-journalists might benefit from auditing their devices and habits to secure their personal information.

Barbara Jungwirth

Barbara Jungwirth writes about medical topics (www.bjungwirth.com) and translates medical and technical documents from German into English (www.reliable-translations.com). She has written for print and online media since her high school days and majored in media studies. You can find her on Twitter at @bjungwirthNY.

Subconsciousness: Automatic Behavior and the Brain

Yves Agid. 2021. Columbia University Press. [ISBN 978-0-231-20127-8. 110 pages, including index. US\$26.00 (softcover).]



Subconsciousness: Automatic Behavior and the Brain delves into the poorly understood connection between structure and function in the brain—particularly regarding intentional and unintentional behavior.

Yves Agid discusses this obscure subject in a 100-page treatise that links the cerebral cortex with the basal ganglia and argues that intentional and unintentional behavior arise from the engagement and disengagement of neural pathways in between. The author clarifies early in his book that subconsciousness is not the Freudian concept of the unconscious

mind—primarily repressed mental content that affects behavior. Subconsciousness is not easily discernible, in contrast to the clear sense of consciousness or meta-consciousness. He narrates a first-person account of a traffic jam in Paris—noting the intentional decisions (consciousness) and self-talk (meta-consciousness) during each event in traffic. Autopilot—driving without intentionally thinking about choices and actions—is the work of the subconscious. Later in the book, Agid asks the question that if the brain is operating on autopilot, is it possible to decide (like when driving) without being aware that a decision was made? (The answer is yes). Herein lies some of the complexity of the subconscious.

Text boxes are one method of highlighting important discoveries toward the link between structure and function in the brain. These pull-out boxes summarize case studies with significant outcomes. Box 4.3, for example, describes the famous psychiatrist Sigmund Freud's rotation in a neurology department (pp. 82–83). This famous neurology research lab studied lesions in various parts of the brain. After death, an autopsy of the spinal cord and brain linked patient behavior while they were alive to the functionality of their brain postmortem. This early work led to the belief that links behavior to the health of various pathways in the different sections of the brain.

It is important to note that although Agid strongly argues that the basal ganglia are primarily responsible for the brain's subconscious functions, it is very much in collaboration with the cerebral cortex. "The basal ganglia are faithful collaborators of the cerebral cortex . . . They are not alone, isolated, and cut off from the rest of the brain, as they involve the cerebral cortex every time they are activated, just as they are activated every time the cerebral cortex drives deliberate behavior" (p. 72). It is a feedback loop of sorts. This description is, of course, a simplification of the extremely complex process occurring. "One might say that this is a caricatured reductionist perspective" (p. 72).

Agid devotes an entire chapter to a discussion about deficiencies in the structure of the brain and how those correlate to functionality. Two diseases that illustrate this well are Alzheimer's and Parkinson's. In Alzheimer's disease the patient has problems related to memory, language, and perception, all controlled by the cerebral cortex while with Parkinson's the patient cannot perform routine tasks like brushing teeth, walking, and

writing—all controlled by the basal ganglia. "These two pathologies are somehow mirrored, which suggests, but does not demonstrate, that the cerebral cortex plays a predominant rule in nonautomatic behaviors, and conversely, that basal ganglia dominate in automatic behaviors (p. 57).

Perhaps because it is unavailable, information is not given to directly support brain scans and the Alzheimer's/cerebral cortex link versus the Parkinson's/basal ganglia link. However, this lifelong researcher in the field of neurology and behavioral science seems convinced that link is probable.

Julie Kinyoun

Julie Kinyoun is an on-call chemistry instructor at various community colleges in Southern California. An avid reader, she enjoys reviewing books that help her become a better educator.

Long Players: Writers on the Albums that Shaped Them

Tom Gatti, ed. 2021. Bloomsbury Publishing. [ISBN 978-1-5266-2578-6. 216 pages. US\$22.00 (hardcover).]



In *Long Players: Writers on the Albums that Shaped Them*, editor Tom Gatti tasks 50 contemporary writers with providing short essays discussing the albums that changed them. At their best, these essays not only provide insight into the art of the album but provide insight into the minds and lives of the writers themselves. When read individually, each essay situates the reader in a pivotal moment in the writer's life as they find themselves in the magic of song. Read as a whole, the book works as a fragmented paean to the power of music to transform and inspire that finds unity through an overriding feeling of wonder. Overall, the writers leave the reader with an impression of each album set in the intermediate space of criticism and memoir that can be both enchanting and frustrating.

Gatti starts the book with a 25-page introduction in which he describes his personal history with the album and the album's history through different eras of technological change before briefly stating how the book came to be. The 50 essays in this collection, around two-to-three pages each, feature a variety of types of writers and music, from popular fiction writer Neil Gaiman on David Bowie's *Diamond Dogs* to 2015

Booker Prize-winner Marlon James on the experimental Icelandic singer Björk's *Post*, from novelist Daisy Johnson on contemporary hip-hop/R&B artist Lizzo's *Cuz I Love You* to literary stalwart Ben Okri writing on Miles Davis' seminal *Kind of Blue*. Though the styles of writing and music vary, each essay centers around "just how deeply this form [the album] is embedded into our lives" (p. 23) rather than straight criticism. Essentially, the strength of this book is in lines like this one from Okri: "There are some rare albums that seem to lift from their physical condition and become part of the decor and mood of a life. They seem not to be music anymore but one of the things that shape you, like the home you grew up in, or your earliest toys, the fragrance of your mother's hair, or the street where you first fell in love" (p. 135).

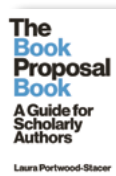
Long Players will appeal to most technical communicators who love music, who will find new musical artists and writers worth checking out as well as insights into old favorites. Some readers, however, may find themselves frustrated by the lack of analysis in some of the essays as to what makes the albums important as works of art.

Dylan Schrader

Dylan Schrader is a proposal developer at the University of Alabama in Huntsville, where he also earned an MA in Professional Communication and is working on an MA in English.

The Book Proposal Book: A Guide for Scholarly Authors

Laura Portwood-Stacer. 2021. Princeton University Press. [ISBN 978-0-691-20967-8. 198 pages, including index. US\$19.95 (softcover).]



The title, *The Book Proposal Book: A Guide for Scholarly Authors*, is precise in exactly what this book is about and who it is for: scholars who want to pitch a book proposal to scholarly publishers, not commercial ones, about their own research. It is a guide for recent PhD graduates who want to turn their dissertation into a book and for all other scholars who want to go down the path toward publishing a book about their own research and work.

The subject of writing a book proposal may seem uninteresting to some readers, and unnecessary to others, but to get information, resources, and tools

directly from an experienced scholarly publisher and scholarly author is priceless. I imagine most scholarly publishers are thankful that this guide exists, because even though most scholars know how to write about their own research, they often do not know how to pitch their writing or work. That is the central aim of Laura Portwood-Stacer's book.

She has a readable style of writing, which makes getting through the book quite easy. The chapters are short, uniform, and full of helpful information, advice, templates, examples, and two consistent sections of Time-Tested Tips and FAQs. There are 14 chapters that break down 20 steps in the book proposal process that begins with choosing a publisher and writing a letter of inquiry, understanding what it means to find comparable works, writing a project description and chapter summaries, attending to style and voice, how to prepare all the pieces of a proposal package, and ends with "Permissions, Proofs, and Promotion." Portwood-Stacer organized the book so that you can accomplish the necessary tasks for each step in the process in small blocks of time if that is what you find your schedule will allow.

Within the chapters, Portwood-Stacer explains common issues and mistakes that scholars encounter when thinking about or submitting book proposals. She offers experienced advice that may surprise you at times and may even be contrary to the advice of other experienced scholars, such as who to contact, when, and what chapters you may want to submit as sample chapters and when to do so. Back matter includes a checklist for the steps in the process and a longer checklist to help you assess your proposal materials, Sample Documents that include three different prospectuses, Suggestions for Further Reading, and Time-Tested Tips and FAQs by chapter, which is a time-saving resource to quickly find answers to commonly asked questions. *The Book Proposal Book* is well written, well organized, and a most helpful, reasonably priced guide for scholars of all ranks.

Diane Martinez

Diane Martinez is an associate professor of English at Western Carolina University where she teaches technical and professional writing. She previously worked as a technical writer in engineering, an online writing instructor, and an online writing center specialist. She has been with STC since 2005.

Speculation: A Cultural History from Aristotle to AI

Gayle Rogers. 2021. Columbia University Press. [ISBN 978-0-231-20021-9. 258 pages, including index. US\$30.00 (softcover).]



Gayle Rogers' erudite study, *Speculation: A Cultural History from Aristotle to AI*, shows how changes in the word "speculation," from its roots in Greek and Latin to its emergence in artificial intelligence (AI), illustrates aspects of European and

American spiritual, philosophical, and financial history.

The word "speculation" originated in the Greek root *-skop*, to "see or view"; then, through a consonant shift, turned into the Latin word, *spec*. Latin usage introduced two variations: *speculum* meant both a physical mirror and introspective self-reflection; *specula* meant to observe unobserved from afar, as if from a watchtower.

Thus, a fundamental tension in the derivative word "speculation" was born: it could mean an inward, meditative, spiritual self-reflection, or an outward, object-oriented view of the world. The former meaning, posited by Boethius, invited deeper self-understanding, and was considered legitimate, a pathway to God; the latter, offering the opportunity to spy on and potentially exploit others, was deemed illegitimate, sinful.

With the advent of the scientific method, speculation in or about things or people became more acceptable. Speculation could now "be 'drawn from matter'" (p. 47), if it was tempered by judgment. One could speculate about how to turn worldly things or people to advantage if the process was supported by empirical evidence and a sense of utility and proportion.

Industrialism and capitalism further cleansed speculation of its potential deceitfulness. Adam Smith "incorporated the gambling spirit of speculation into legitimate, even enlightened practices" (p. 81, emphasis in original), but again with a proviso: speculation had to be "grounded in the predictability of returns over time" (p. 80), and tied to something of material value, like gold.

Despite these efforts, contemporary schemes like the South Sea Bubble introduced a new problem: financial "expectation as a type of possessed madness" (p. 93). Initially diagnosed as a mental illness of the individual, then identified as the powerful bandwagon effect of crowds, speculation became synonymous with mania and feverish mass self-deceit.

In America, speculation, animated by the energy and raw "spirit" (p. 92) of inventing a new country, created an atmosphere that prompted everyone—including marginalized groups like women—to bet on the market based on price fluctuations alone. New ticker tape technology "radically dematerialized" (p. 117) and intensified the "velocity and immateriality of speculation" (p. 118), turning information itself into a commodity for even further speculation, irrespective of its intrinsic economic value.

Today's ticker tape is the networked computer, with ubiquitous electronic speculators increasingly dependent on sophisticated software to trade bits of ephemeral information, leading to the question: "Can machines *speculate*?" (p. 177).

Rogers does not answer definitively, perhaps because neither he nor anyone else can. He ends his impressively researched cultural history by noting that "every decision is a risk. Every risk is a decision" (p. 180). If so, whether automation resolves speculative uncertainty is itself speculative, and as always, the only certainty may be the truism: "It depends."

Donald R. Riccomini

Donald R. Riccomini is an STC member and was a senior lecturer in English at Santa Clara University, where he specialized in engineering and technical communications. He previously spent twenty-three years in high technology as a technical writer, engineer, and manager in semiconductors, instrumentation, and server development.

Tales of the Pen Master: Zen Stories for Editors, Proofreaders, and Other Publishing Professionals

Jack Lyon. 2021. The Editorium LLC. [ISBN 978-1-4341-0483-0. 76 pages. US\$24.95 (hardcover).]



The book reviewer interrupts the Pen Master's lunch with a question that has weighed upon his mind. "How," he asks, "is one to review a book?" "One must first ask what the author's goals are," the Pen Master replies. "And how does one know that?" the reviewer wonders.

The Pen Master ponders a moment. "If the author has whetted your appetite to learn more, then they have succeeded at their goal."

In the practice of Zen, a koan is a thought puzzle intended to make you challenge your certainties,

and in so doing, undermine those certainties to achieve insights that will reframe your subsequent understanding. In *Tales of the Pen Master: Zen Stories for Editors, Proofreaders, and Other Publishing Professionals*, Jack Lyon serves a tasty feast of challenges to inspire that hunger in anyone who works with words.

Each chapter begins with a short koan crafted by Lyon to introduce a different and important editing concept, including rules, mechanics, technology, meaning, knowledge, and the elusive nature of perfection. *Tales of the Pen Master* is full of simple yet profound wisdoms on a wide range of subjects. He enhances each topic by including both modern and ancient koans that provide further food for thought. Throughout, he emphasizes the self-effacing goal of editing: to clarify the author's message and convey it as effectively as possible to their readers.

Lyon notes that “even if you know ‘the rules,’ editing is not about making sure a manuscript always follows them”; in this concise book, it's the job of the Pen Master “to open the minds of editors and proofreaders everywhere” to understanding (p. ix). *Tales of the Pen Master* accomplishes this with the same elegance as the many watercolor reproductions that illuminate the book and shed light on its meaning.

This slim book is not one to be devoured in a single sitting, but rather something to be savored, perhaps at a rate of a single chapter per day, to give yourself time to ponder and learn. And to start over again once you reach the end, for the journey to wisdom is iterative, not a one-way trip. *Tales of the Pen Master* would make a great gift for the editor in your life—or for yourself.

Geoff Hart

Geoff Hart is an STC Fellow with more than 30 years of writing, scientific editing, translation, and information design experience. He's the author of two popular books, *Effective Onscreen Editing* and *Write Faster With Your Word Processor*.

What Are the Chances?: Why We Believe in Luck

Barbara Blatchley. 2021. Columbia University Press. [ISBN 978-0-231-19868-4. 240 pages, including index. US\$27.95 (hardcover).]



Barbara Blatchley's *What Are the Chances?: Why We Believe in Luck* is about our belief in luck and its role in our lives. The book includes many stories about “lucky” or “unlucky” people that are explored through the lenses of psychology and neuroscience.

Through this exploration, Blatchley touches many subjects: history, magic, religion, randomness/chaos, statistics, perception, and many more.

You don't need to be a psychologist or neuroscientist to understand the book because Blatchley is excellent at explaining the complex ideas and even reminding you of the concepts when she revisits them in later chapters. In fact, what makes this book accessible to the average reader, makes it insufficient to anyone that understands the current research on the topic. Blatchley introduces the study of luck, providing a synopsis of a vast amount of research as evident by the 20 pages of notes and the 14-page bibliography.

All this research comes to the consensus that our “illogical” belief in luck actually “makes us feel less anxious. When we're less anxious, we can devote more of our mental energy to solving the problem. Success is a feed-forward loop; it breeds itself, and we feel lucky” (p. 190). As a result, luck is “like the placebo effect in medicine. If I believe that this little green pill will make me feel better, and when I take it, I feel better, does it really matter what is in the pill?” (p. 187). Not to Blatchley, who admits she owns a lucky pair of shoes herself.

If, like me, you've scoffed at lucky talismans or rituals in the past, you might benefit from Chapter 7, “How to Get Lucky,” which provides the characteristics of “lucky” people. Blatchley's point being that we can all be lucky if we learn to adopt these characteristics. In conclusion, if you're looking for insight on the history of luck, why we believe in it, or want to know how to be “lucky,” then *What Are the Chances?* is worth the read.

Sara Buchanan

Sara Buchanan is an STC member and a content strategist at LCS in Cincinnati, Ohio. In her free time, she's an avid reader, enjoys cooking, and doting on her cats: Buffy and Spike.

Educating Tomorrow: Learning for the Post-Pandemic World

Chris Brown and Ruth Luzmore. 2021. Emerald Publishing. [ISBN 978-1-80043-663-3. 188 pages, including index. US\$23.99 (softcover).]



Does a post-pandemic world provide us with a blank slate for change in society overall and education in particular? That is a question Chris Brown and Ruth Luzmore ask in *Educating Tomorrow: Learning for the Post-Pandemic World*.

Can education emerge as new and improved in the post-pandemic future? Can we take the global challenges we now face and make a better tomorrow? Brown and Luzmore also address these questions in *Educating Tomorrow*. Their thoughts provide great food for thought.

Brown is a professor at Durham University (UK) and Luzmore is a primary school teacher in London and PhD student at Durham. Their perspective in *Educating Tomorrow* reflects ideas related to how England's educational system could change in the future due to not only the aftermath of the pandemic but also due to global environmental and democratic changes.

To give an idea of the scope of topics covered, consider how the authors summarize in a table the purpose of education over time (pp. 71–73). As a sampling from the table, in ancient Greece, there is no formal public education. During the rise and fall of Rome, the table shows a “widespread system of education with the purpose of preparing boys of wealth to enter the government” (p. 70). During the industrial revolution, “private education continues for those who can afford it” (p. 72). In what the authors call the welfare state, there is a “radical change in offer of education until age 16” (p. 72).

If you (or your students) enjoy thinking about topics covered in a chapter such as a Brief History of Education from Ancient Greece to the Enlightenment (p. 39) or From Universal Basic Income to Aristotle and Back (p. 101), this would be a good read for you.

Only time will tell if there are changes in society and education in a post-pandemic world, and we can, of course, hope for changes that could be considered a better world in the future.

Jeanette Evans

Jeanette Evans is an STC Associate Fellow; active in the Ohio STC community, currently serving on the newsletter committee; and co-author of an *Intercom* column on emerging technologies in education. She holds an MS in technical communication management from Mercer University and undergrad degree in education.

Write Here: Developing Writing Skills in a Media-Driven World

Randi Brummett de Leon and Brooke Hughes. 2020. Broadview Press. [ISBN 978-1-55481-477-0. 384 pages, including index. US\$49.95 (softcover).]



Media now certainly drives the world and social media has become an inseparable part of human life. Randi Brummett de Leon and Brooke Hughes could not have waited for a more opportune time to plan a book like this, which “is designed to teach you essential reading and writing skills, using media examples to help explain academic concepts and provide opportunities for practice” (p. 12).

Thoughtfully divided into four parts, *Write Here: Developing Writing Skills in a Media-Driven World* houses learning materials for core skills like reading and writing in Part I, media studies in Part II, academic writing in Part III, and writing basics in Part IV. Each part then has multiple scope-defined chapters. By design, each chapter in the book pays special attention to sufficient self-assessment of learning.

Part I – Connecting Reading and Writing deals with the reading and the writing skills in greater detail. The chapter on Reading covers pre-reading, rereading, and post-reading activities; the chapters around Writing discuss prewriting and rewriting phases, as well as essay writing. The emphasis on core writing can be felt as students progress through the chapters on parallels between reading and writing, modes of writing, timed writing, rhetoric, and errors in thought.

Part II – Analyzing the Media deals with basic concepts around social media, advertisements, news, and television. This part briefly explains the purpose,

the audience, and the types of these media elements. The writing prompts, discussion topics, class debates—such essentials establish that this book can be a practical classroom guide.

The complete research paper process—from topic selection to framing the research question, to linking the purpose and audience, to framing the thesis statement and exploring the sources, through organizing research to preparing the draft—is covered in Part III – Exploring Academic Writing. It also discusses the efficient ways of using sources in research and educates briefly about plagiarism. The chapter around MLA/APA Documentation styles makes this part more comprehensive.

In Part IV – Polishing Your Writing, the authors intend to brush up the students' grammar basics. This part is designed to revisit the elements of foundational grammar so they can approach their writing with confidence. For those who just need to revise their grammar fundamentals, such as parts of speech, subject–verb agreement, pronoun–antecedent agreement, fragments, run-ons, punctuation, and easily confused words, shall find this part useful.

The “Assessing Your Knowledge” and “Deepening Your Understanding” sections at the end of each chapter will come in handy for serious learners to evaluate their learning. The authors by their example exercises have provided necessary guidance to the readers to attempt their turn.

Leon and Hughes have assembled in *Write Here* all elements that students of a developmental composition classroom would be required to master. Written in a conversational tone and replete with contextual examples, this book offers a great learning experience to its readers.

Arun Dash

Arun Dash works as a Staff Technical Author for Salesforce, Hyderabad, India. With over a decade of technical writing experience, he has experimented with writing for various domains. He now continues his PhD in English from KIIT University, Bhubaneswar.

Visual Communication: Insights and Strategies

Janis Teruggi Page and Margaret Duffy. 2022. Wiley- Blackwell. [ISBN 978-1-119-22647-5. 322 pages, including index. US\$59.95 (softcover).]



Visual Communication: Insights and Strategies is a great, informative textbook that explores the use of visuals in different industries, strategies to understand images impact and functions, and guidance to create effective and ethical visual

communication. Janis Teruggi Page and Margaret Duffy argue the importance of understanding visual culture now more than ever due to changes in technology and the effects this has on how people process and interpret visuals. After introducing the idea of visual culture, the authors use research and theory to demonstrate the importance of their three-step process—research, evaluate, create—for visual imagery. Page and Duffy provide opportunities for the reader to apply this three-step process to several different aspects of visual imagery including sign language, storytelling, and artifacts. This process engages the reader with the material and provides an opportunity to create their own visual imagery.

Page and Duffy demonstrate how an image is worth much more than 1,000 words and can have just as many interpretations based on rhetorical choices. The book explains how visual imagery is much more complex than just an image by exploring the use of metaphors as a means of understanding, the value of ethics in creating visual imagery, the science behind semiotics, and additional elements. The authors offer this expansive understanding of how visual imagery can be interpreted or understood before investigating how their research can be used to execute visual imagery in different industries. An examination of cultural and environmental effects on how individuals interpret images and their meanings adds an unexpected idea of considering ethics when creating content, which is valuable in a society that obtains most of their content through visuals.

The authors use modern examples, such as memes and recent political campaigns, to prove that visual imagery is growing in importance in storytelling, marketing, politics, and pop culture, and shows how technology can be used to enhance our understanding and creation of visual imagery. The provided examples are relevant in time and context to their research helping their audience to further understand

and execute the practices presented in *Visual Communication*.

I enjoy the simplistic structure of the textbook. Each chapter provides key learning objectives, a chapter overview, key terms, and practice activities that tests the reader's knowledge of what was discussed in the chapter individually or in a classroom conversation. Additionally, throughout each chapter there are "focus" sections that provide examples demonstrating the research and information provided in the chapter. Each chapter is organized and separated according to the learning objectives providing an exact focus and making it a simple, yet effective way of learning.

Visual Communication: Insights and Strategies accomplishes the goal of providing strategies to create and critically evaluate visual imagery in several different industries. The book would be a great resource for students being introduced to marketing, public relations, or communications.

Meagan Lowney

Meagan Lowney is a graduate student at Kennesaw State University (KSU) pursuing an MA in Professional Writing. She currently serves as the Managing Editor for *The Broadside*, the Department of English's digital newsletter at KSU.

Bernoulli's Fallacy: Statistical Illogic and the Crisis of Modern Science

Aubrey Clayton. 2021. Columbia University Press. [ISBN 978-0-231-19994-0. 368 pages, including index. US\$34.95 (hardcover).]



Modern science is amid an ongoing crisis. Many fields, especially those fields that rely heavily on testing and statistical reasoning—psychology, sociology, medical research, and more—are finding that upwards of half the research studies done in recent decades cannot be replicated.

In *Bernoulli's Fallacy: Statistical Illogic and the Crisis of Modern Science*, Aubrey Clayton tackles the crisis head on. In a brilliant blend of history and logical reasoning, he argues that the crisis is rooted in a fundamental logical flaw in our thinking about probability.

Briefly stated here, but clearly and carefully explained in the book, modern statistical methodology—normal distributions, null hypotheses

testing, p-values, chi-squares, and all the rest—is about the frequency distribution of sampling errors, and, it turns out, sampling probabilities, taken alone, simply do not provide sufficient grounds for making sound inferences about the world. You also need a way to factor in your current state of knowledge including such things as conditional probabilities, alternative explanations for observed data, and more.

As early as the mid-1700s, Thomas Bayes developed a framework—Bayes' theorem—that uses inductive reasoning and conditional probabilities to estimate the degree of confidence one might place in various hypotheses about observed data. Bayesian methods, too, are not without their problems, and for much of the ensuing centuries the relative merits of frequentist versus Bayesian approaches were subject to lively debate.

To explain how Bayesian methods came to be marginalized, Clayton traces the development of modern statistics, primarily through the work of three major innovators of frequentist methods: Francis Galton, Karl Pearson, and Ronald Fisher. In tandem with their influential statistical work, they each played leading roles in the eugenics movement. To bolster the credibility of both their statistical project and their social agenda, they fought a largely successful "frequentist Jihad" to purge the practice of statistics of any hint of Bayesian inferential reasoning—henceforth probability would mean sampling frequency and nothing more.

To illustrate, and help us avoid, the logical traps inherent in frequentist methods, Clayton walks us through a variety of intriguing statistical problems ranging from brain teasers like the "Monte Hall" problem, to real-world problems involving statistical reasoning: psychological testing, courtroom argument, medical diagnosis, and more. In each he shows how current frequentist methods lead to problems, and how the use of Bayesian methods lead to better results.

Clayton does not claim originality for his arguments and says they can all be found in the statistical literature. That said, Clayton is an excellent writer. In making the Bayesian case, he has clearly related the fascinating history of the development of statistical methods and has made key issues usually known only to specialists accessible to a broad audience. Whether you are a statistician, a working scientist, or an

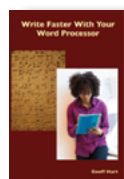
interested layperson, *Bernoulli's Fallacy* is science writing at its best and should be well worth your while.

Patrick Lufkin

Patrick Lufkin is an STC Fellow with experience in computer documentation, newsletter production, and public relations. He reads widely in science, history, and current affairs, as well as on writing and editing. He chairs the Gordon Scholarship for technical communication and co-chairs the Northern California Technical Communication competition.

Write Faster with Your Word Processor

Geoff Hart. 2021. Diaskeuasis Publishing. [ISBN 978-1-927972-29-8. 358 pages, including index. US\$22.00 (softcover).]



Geoff Hart's *Write Faster with Your Word Processor* is about "mastering the tools you use to craft fine writing...so well that you stop focusing on the mechanics of writing and pay more attention to the craft" (p. 1).

This book takes you through the aspects of writing any type of genre with a word processor. While Hart's book mostly talks about Microsoft Word, he does state emphatically throughout that many of his tips, tricks, or techniques are transferable to any other word processing software. What I enjoyed the most is seeing some of the things I had forgotten about Microsoft Word and learning a few new things that I was not aware of.

Writer Faster with Your Word Processor is broken into four parts. Part 1 covers getting started where you learn how to personalize how your computer works and develop safeguards; Part 2 is about writing your first draft; Part 3 is about revising your draft; and Part 4 covers appendices and miscellaneous resources. This book is not meant to be read cover to cover. Hart has written this as a reference book so that you can go to the chapter you want to read, learn, and put that learning into practice.

Chapter 7, "Moving Around," gives tips on creating macros or using Microsoft shortcut keys for jumping through sections. I use the standard ones in common find-and-replace searches: ^p (paragraph symbol, ¶) and ^t (tab symbol, →). I learned through Hart's book about ^m (manual page break), ^b (section break), and ^l (ell, line break). These will now improve my find-and-replace usage tremendously. He does provide an extensive list of ^ shortcuts for find and replace on

pp. 172–173. I encourage you to read this chapter to learn more about these useful shortcut keys. Another movement tip describes the use of the F2 key to select and move text from one location in your Word document to a different location without the need of our friend, copy and paste (p. 100).

With today's use of the Internet as our main library and resource center, Hart lists several reasons to use the Internet effectively in Chapter 10, "Use the Internet." He does caution that you look for and consider author bias for any online resource or reference you do use. He suggests consulting more than one source to draw your own conclusions to improve your writing.

Styles and templates, shortcut keys, and use of the Internet: these are the few things that writers rely on every day. In Chapter 11, "Develop Style Sheets," Hart has a table in the "Using a Style Sheet" section that provides tips on writing down the computer terms, formatting, and structural/sequence usages in your own writing. You can use this table to ensure that consistency in your writing is not left until the last minute.

The final section I enjoyed was "Appendix III: Word Keyboard Shortcuts (Plus Selected Operating System Shortcuts)." The one drawback here is that the information is in paragraph format where it might have been better represented in a tabular format for easier use as a reference.

While the book does not have exercises, you should be able to read and practice using your own examples. Unfortunately, it has no graphics, is written in a dense style, lacks use of white space making it difficult to read, and does not stay flat when trying to use it to practice the concept. Overall, *Write Faster with Your Word Processor* is a reference book that will help those new to word processors or those more experienced that may need a reminder of the features available to increase our productivity.

Jackie Damrau

Jackie Damrau is an STC Fellow with more than 25 years of technical communication experience. She serves STC in as the book review editor for *Technical Communication* and is also the Co-chair of the 2021-2022 STC Education Committee.

Design for Safety

Eva PenzeyMoog. 2021. A Book Apart. [ISBN 978-1-952616-09-9]. 154 pages, including index. US\$24.00 (softcover).]



Every now and again, a book comes along that totally changes your perspective. *Design for Safety* by Eva PenzeyMoog was that book for me. Before reading this book, I had heard a few horror stories about women being stalked by someone through

their running app or of jealous exes tracking victims through social media, but I never realized the true dangers involved with the Internet of Things (IoT) technologies that we use in our everyday lives. In *Design for Safety*, PenzeyMoog not only describes many of these security loopholes, but she also explains how designers can anticipate some of these security flaws and include safety into the design process.

Design for Safety is a book on a mission. PenzeyMoog's goal is to stop technology-facilitated violence (TFDV) (pp. i–iii). One in three American women and one in four American men will experience violence from an intimate partner in their lifetimes. The data contained in our technologies can facilitate this abuse by giving away location data and other personal information (p. 1). Often, the user doesn't even know that they have consented to the collection of this data, or they do not know how to, or are unable to, stop its collection.

The author uses personal accounts from TFDV victims to illustrate how easily an unsuspecting person can be tracked or harassed through the technologies they use every day. These vignettes illustrate how something as basic as a smart thermostat or a grocery store app can become weaponized to cause distress. PenzeyMoog uses practical examples, such as the development of car seatbelt safety laws, to explain how citizens can fight back against companies that are unwilling to provide basic safety features (p. 116).

Despite her assertion that companies will often choose expediency and profit over safety (p. 112), industry technology developers and usability experts can learn from this book. Chapter 5 contains concrete suggestions for including safety measures and closing security loopholes at every step of the process, from planning to design and even in the writing of the user documentation.

Academics can benefit from reading *Design for Safety* as well. Any academic researching or teaching

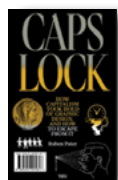
usability would discover a gold mine of information about identifying representative participants for usability tests in Chapter 6, as well as about designing sensitive test questions and remote interview strategies for users who have been TFDV survivors. I plan to include a discussion of the ethical design of IoT technologies as part of my Web Publishing class to help my students understand the power of data collection and the implications of its misuse.

Nicole St. Germaine

Nicole St. Germaine is a Professor in the Technical and Business Writing Program at Angelo State University, as well as a freelance writer and consultant. Her research interests include technical communication for a Mexican American audience and technical communication in the health fields.

CAPS LOCK: How Capitalism Took Hold of Graphic Design, and How to Escape from It

Ruben Pater. 2021. Valiz. [ISBN 978-94-92095-81-7. 556 pages, including index. US\$27.50 (softcover).]



CAPS LOCK: How Capitalism Took Hold of Graphic Design, and How to Escape from It by Dutch author and graphic designer Ruben Pater is broken into four parts, in which Pater examines the history of capitalism from various aspects of the design practice, including the designer as scribe, brander, salesperson, worker, amateur, and educator, among others. Some of the connections to capitalism may seem obvious, such as the brander, salesperson, and even the worker, Pater makes connections to all these identities to the continued promotion and proliferation of graphic design as a deeply entrenched capitalistic practice and shows that even some well-intentioned identities, such as the designer as futurist and philanthropist may not have the outcomes expected when greedy corporations appropriate their work for profit.

The “The Designer as Scribe” section examines the history of graphic design and makes ties to capitalism as far back as the first writing systems and shows that the first uses of the Ancient Mesopotamian writing system known today as cuneiform was for receipts and accounting purposes—in other words, to support capitalism. Readers may also be surprised to learn that capitalism had well-intentioned beginnings.

Pater describes the rise of capitalism out of the Enlightenment era, where individuals sought to break free from the feudal past when most people were beholden to landowners or the aristocracy. However, he goes on to show that, “Capitalism has failed to deliver on its promise that it would create an economic system of freedom and prosperity for all” (p. 7).

CAPS LOCK describes the historical and continued inequities of design practice including marginalization as an unequal access to the profession, pay, and leadership roles by minorities, women, and individuals who identify as LGBTQ. It points to a long history of racism in advertising used to promote products that were developed through the exploitation of cheap labor and slavery and shows that exploitation still exists when design students receive unpaid internships. A practice that continues to perpetuate inequities in the profession. Of course, this issue offers an obvious solution, which is to pay your interns.

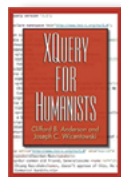
CAPS LOCK is at once a history and a criticism of the capitalist practices that define most aspects of the graphic design profession as we know it today. For those who are struggling to break from the capitalist tendency of the graphic design profession, at times the contents of this book will seem bleak, as it shows, “Through its anti-capitalist critique, graphic design has become more, not less entangled with capitalism” (p. 5). Yet despite the scathing criticism the book offers, it presents hope for designers who wish to “escape.” Part III presents accounts of practices that push back and embrace community over profit. Pater examines five design-based cooperatives to show how nonhierarchical approaches to design practice can exist, where co-design is practiced, and individual designers are not heralded as creative genius over the work of the group, showing that with work one could break free from the capitalist-driven practice of graphic design.

Amanda Horton

Amanda Horton holds an MFA in Design and currently teaches graduate and undergraduate courses at the University of Central Oklahoma (UCO) in the areas of design history, theory, and criticism. She is also the director of the Design History Minor at UCO.

XQuery for Humanists

Clifford B. Anderson and Joseph C. Wicentowski. 2020. Texas A&M University Press. [ISBN 978-1-62349-829-0. 350 pages, including index. US\$50.00 (softcover).]



XQuery is an incredibly useful language for querying and transforming XML documents. As an information architect, my team and I have recently been tasked with learning XQuery so that we can search across numerous large XML

documents and ensure the information contained within conforms to certain requirements. While I don't fall into this book's primary audience of scholars in the digital humanities, I was nonetheless intrigued by *XQuery for Humanists'* pledge to ease the reader into what can be an intimidating language. I'm pleased to report that this book delivers on that promise.

Whereas other, more programmer-oriented, books might present new concepts using examples from math (“Let's write a simple function that returns the factorial of your argument”), *XQuery for Humanists* illustrates its concepts with poems, prose, or library catalog entries. This helps make an admittedly still-difficult subject about as easy as it can be.

I would recommend any reader to follow along with the numerous code samples by entering them into your chosen XQuery processor, as I did for much of the book. As with any text of this nature, the true leaps in learning will come only alongside practice; merely reading from cover to cover will provide limited benefits. Each of the book's thirteen chapters concludes with questions and exercises to solidify your understanding of the concepts. I found that the exercises were just the right difficulty, being not too overwhelming but often prompting me to go back through the chapter to review specifics. I can't imagine a better XQuery textbook for a graduate-level course than this.

Reading *XQuery for Humanists* feels like an extended one-on-one office session with a wise, experienced colleague. Clifford B. Anderson and Joseph C. Wicentowski taught this material in seminars for several years before writing this book. Their experience shows in the way that they seemingly anticipate follow-up questions every time they introduce a new concept. I also greatly appreciate how they are quick to alert the reader to obscure, program-breaking quirks as soon as you need to know them.

If you are a non-programmer who regularly deals with documents encoded in XML, TEI, DITA, or other structured markup languages, learning even a modicum of XQuery will put you head-and-shoulders above your peers. If nothing else, you should read this book to open your eyes to the world of possibilities awaiting you once you learn how to process text efficiently and programmatically.

Josh Anderson

Josh Anderson, CPTC, is an Associate Information Architect at Precision Content. He was an English teacher in Japan and an SEO Specialist in the Chicagoland area before earning a Master of Information at the University of Toronto.



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